THE LANCET

A Journal of British and Foreign Medicine, Surgery, Obstetrics, Physiology, Chemistry, Pharmacology, Public Health, and News.

TELEGRAPHIC ADDRESS—LANCET, WESTRAND LONDON TELEPHONE NUMBER—GERRARD 5356

No. XVII. of Vol. I., 1918.
No. 4939. Vol. CXCIV. LONDON, SATURDAY, APRIL 27, 1918. Price 8d.

Fourth Edition. With 22 Illustrations. Price 4s. net.

BLOMFIELD'S ANÆSTHETICS.

"A truly excellent manual."—LANCET.

London: Baillière, Tindall & Cox, 8, Henrietta-st., Covent Garden, W.C.2.

Now Ready. Crown octavo. 56 pp. Illus. Price 1s. 6d. net; by post 1s. 9d.

NOTES ON MILITARY ORTHOPÆDICS.

By PAUL BERNARD ROTH, F.R.C.S. "Should be in the hands of every surgeon on active service."—MEDICAL WORLD.

Henry Kimpton, 263, High Holborn, London, W.C.

IN THE PRESS.

VENEREAL DISEASE AND ITS PREVENTION.

By OTTO MAY, M.A., M.D., M.R.C.P.,
Late Hon. Secretary, National Council for Combating Venereal Diseases.

Crown 8vo. Cloth.

Henry Frowde and Hodder & Stoughton, Oxford Press Warehouse, Falcon square, London, E.C. 1.

Now Ready. Price 1s.

APPLICATION of TRUSSES to HERNIÆ.

Clinical Lecture delivered at King's College Hospital.

By the late JOHN WOOD, F.R.S.,
Senior Surgeon to King's College Hospital.

Reprinted from "Medical Examiner." With Illustrations.

London: Matthews Brothers, 10, New Oxford-street, W.C.

BY P. LOCKHART-MUMMERY, F.R.C.S.

DISEASES OF THE COLON AND THEIR SURGICAL TREATMENT.

Numerous Illustrations and Coloured Plates. 10s. net.

Baillière, Tindall & Cox, 8, Henrietta-street, Covent Garden.

BONESETTING and the TREATMENT of PAINFUL JOINTS.

By FRANK ROMER, M.R.C.S., L.R.C.P., and
L. ELIOT CREASY, M.R.C.S., L.R.C.P.

Crown 8vo, 1s. net.

"Messrs. Romer and Creasy strip this branch of practice of the cloud of mystery and miracle which has been thrown around it by interested people and well-meaning but ignorant supporters. They effectually disprove the foolish charge that the medical profession has wilfully ignored the subject, and they have dealt with it in an unprejudiced spirit. Moreover, they bear witness to the fact that the profession keeps an open mind as to everything connected with the treatment of disease and the relief of pain and physical disability, and is willing to learn from any source anything that may seem likely to be useful for these purposes."—BRITISH MEDICAL JOURNAL.

James Nisbet & Co., Limited, 22, Berners-street, W.

Second Edition, Enlarged. Now Ready. Crown 8vo. 6s. net.
With 30 original Photographs and 150 special Prescriptions.

TREATMENT OF DISEASES OF THE SKIN.

By KNOWSLEY SIBLEY, M.D. Camb.

London: Edward Arnold, 41 and 43, Maddox-street, W. 1.

STAMMERING, LISPING, and CLEFT-PALATE SPEECH.

By Mrs. BEHNKE. (N.B.—Mrs. Behnke is English.)

Price 2s. net (postage 2d.), of Mrs. Behnke, 18, Earl's Court-square, S.W., who receives Stammerers for Treatment.

REFERENCES to Medical Practitioners whose stammer Mrs. Behnke has cured, and to others.

USEFUL BOOKS

PUBLISHED BY SAUNDERS.

See Advertising Page 3.

BY LIEUT.-COL. ROBERT HENRY ELLIOT, M.D., B.S. Lond., D.Sc. Edin., F.R.C.S. Eng., I.M.S. retd.

GLAUCOMA:
A HANDBOOK FOR THE GENERAL PRACTITIONER.
"An excellent summary of the subject in small compass."—BRITISH JOURNAL OF OPHTHALMOLOGY.
Just Published. Pp. xi. + 57. With 19 Illustrations. Demy 8vo. 3s. 6d. net; post free, 3s. 10d.

GLAUCOMA:
A TEXT-BOOK FOR THE STUDENT OF OPHTHALMOLOGY.
Just Published. Pp. xvi. + 546. With 158 Illustrations.
Demy 8vo. 21s. net. Inland postage 6d.

THE INDIAN OPERATION OF COUCHING FOR CATARACT.
Incorporating the Hunterian Lectures delivered before the Royal College of Surgeons of England, February 19th and 21st, 1917.
Pp. xii. + 91. With 45 Illustrations.
Royal 8vo. 7s. 6d. net. Inland postage 5d.
H. K. Lewis and Co. Ltd., London.

SCLERO-CORNEAL TREPHINING IN THE OPERATIVE TREATMENT OF GLAUCOMA.
Second Edition. 1914. Demy 8vo. 7s. 6d. Inland postage 5d.
"The book should be carefully studied by every ophthalmic surgeon."—THE LANCET.
"The book ought to take a foremost place in ophthalmological literature."—THE PRACTITIONER.
George Pulman and Sons Ltd., London.

FOUR NEW EDITIONS.

TAYLOR'S MEDICINE.

11th Edition. With 12 Plates and 85 Text-figures. 24s. net (postage 7d.).

"*Sir Frederick Taylor as a teacher of long experience, has admirably met the students' needs by setting forth the present state of knowledge clearly and briefly. ..... The volume is well balanced, exactly adapted to its purpose, and fully up-to-date.*"—BRITISH MEDICAL JOURNAL.

WHITE'S MATERIA MEDICA, PHARMACOLOGY, AND THERAPEUTICS.

16th Edition. 8s. 6d. net (postage 5d.).

"*It is fortunate that the continued sale of this essential handbook, even in war time, has made it possible to bring out a new edition. The book is a safe guide to war-time as to peace-time practice.*"—THE LANCET.

HEWLETT'S BACTERIOLOGY.

CLINICAL and APPLIED.

6th Edition. With 31 Plates and 69 Text-figures. 14s. net (postage 6d.).

The text has been revised throughout, many sections have been rewritten and much new matter has been introduced. Prominence is given throughout to those microbic conditions having a bearing on war medicine and surgery. Several new figures and plates have been introduced.

HEWLETT'S PATHOLOGY.

GENERAL and SPECIAL. With Special References to War Conditions.

4th Edition. With 37 Plates and 15 Text-figures. 12s. 6d. net (postage 6d.).

"*The fourth edition of Prof. Hewlett's book maintains the general standard of excellence of the preceding editions. ..... The book remains an admirable one for students of medicine; it is concise and clear and contains a sufficient summary of the various theories concerning some of the more complex phenomena to form a sound basis on which to build further study.*"—BRITISH MEDICAL JOURNAL.

London: J. & A. CHURCHILL, 7, Great Marlborough Street, W. 1.

By Royal Warrant

To H.M. King George V. — To H.M. Queen Alexandra.

Holders of Royal Warrants during three successive Reigns.

Jeyes' Fluid—Best and Safest Disinfectant.

Cyllin—**Jeyes' Special Fluid.** The relatively non-poisonous Bactericide.

Cyllin Medical—A refined preparation of Cyllin.

Jeysol — Identical with Lysol.

Cyllin Throat Pastilles } Antiseptic.—For all
" " Lozenges } Throat Affections.

PROFLAVINE. **Diamino-Acridin Sulphate ($C_{13}H_{11}N_3$—H_2SO_4).**

The wonderful antiseptic properties of this synthetic Acridin derivative in serum were discovered at the Bland-Sutton Institute by Dr. Browning and his colleagues.

The recent official trials by the R.A.M.C. on penetration wounds at the Front have fully borne out their optimistic predictions, *vide* LANCET, October 27th, 1917, and November 3rd, 1917.

It is undoubtedly a most successful first dressing for wounds, and may be employed with a minimum of discomfort to the patient.

A British product manufactured in our own laboratories.

Price of 5-gramme bottle **1/4.** Special quotations for quantities.

Jeyes' Sanitary Compounds Company, Ltd., 64, Cannon Street, London, E.C.4.

GOLD MEDAL, INTERNATIONAL CONGRESS OF MEDICINE, LONDON, 1913.

MIST. HEPATICA CONC. (HEWLETT'S)

COMPOSITION.—**Ext. Cascaræ, Ext. Rhei, Jalapin, Podophyllin, Cocainæ Hydrochlor., 1-12th gr. in each fluid drachm.**

THIS excellent compound, first introduced as a general **aperient** and **cholagogue,** has now become a popular remedy, and attention has very recently been called to the value of the mixture, by various authorities, in that class of cases spoken of as Chronic Biliousness, in Catarrhal Jaundice, and in the Jaundice of simple Hepatic Torpor. **In passive or habitual Congestion of the Liver, so frequently met with, it has been used with marked benefit.**

In the treatment of acute or temporary constipation, frequently met with in the convalescence from acute disease, and in pregnancy, or in the constipation due to sedentary habits, to a deficiency of intestinal secretion and of peristalsis, the mixture can be prescribed with wonderful effect, positively curing cases that have resisted other remedies.

The Dose is from 10 to 60 minims, according to the age and condition of the patient. One drachm is a direct aperient, and is not accompanied by griping or tenesmus.

Packed for Dispensing only in 10-oz., 22-oz., 40-oz., and 90-oz. Bottles.

Please write: "Mist. Hepatica Conc. (HEWLETT'S)" to ensure obtaining this Preparation.

C. J. HEWLETT & SON, Ltd.,

Wholesale and Export Druggists and Manufacturing Chemists,

35 to 42, CHARLOTTE STREET, LONDON, E.C 2.

THE LANCET.

No. 4939. LONDON, SATURDAY, APRIL 27, 1918. Vol. CXCIV.

CONTENTS.

The whole of the literary matter in THE LANCET is copyright.

ILLUSTRATIONS of the Agglutination Method of Diagnosis in Triple Inoculated Individuals. By H. MARRIAN PERRY, L.R.C.P., L.R.C.S.Irel., Captain, Royal Army Medical Corps, No. —— Stationary Hospital, B.E.F. With a Note by Colonel Sir WILLIAM LEISHMAN, C.B., F.R.S., K.H.P., A.M.S., Advisor in Pathology, B.E.F. —(*Illustrated*)..... 593

ORIGINAL ARTICLES.

Septic Phlebitis due to Gunshot Wounds. By H. BURROWS, M.B., B.S.Lond., F.R.C.S. Eng., Captain, R.A.M.C. (T.F.)..... 601

Cerebro-Spinal Fever: Notes on 92 Consecutive Cases. By W. H. W. ATTLEE, M.A., M.D., Cantab., Captain, R.A.M.C. (T.C.). — (*Illustrated*)..... 602

Trench Fever: Observations on the Condition of the Spleen and Leucocytes. By D. L. TATE, M.D., Ch.B. Glasg., Captain, R.A.M.C. (T.C.); and J. W. McLEOD, M.B., Ch.B. Glasg., Captain, R.A.M.C. (T.C.)..... 603

A Note on Eye-strain. By A. S. COBBLEDICK, M.D., B.S. Lond..... 604

The Restricted Diet of a Sedentary Worker. By A. D. WALLER, M.D.Aberd., F.R.S. —(*Illustrated*)..... 611

War Bread. By EDMUND I. SPRIGGS, M.D. Lond., F.R.C.P. Lond., Senior Physician, Duff House, Banff; late Senior Assistant Physician to St. George's Hospital and Dean of the Medical School..... 613

MEDICAL SOCIETIES.

ROYAL SOCIETY OF MEDICINE:
SECTION OF EPIDEMIOLOGY AND STATE MEDICINE: Epidemiology of T.N.T..... 605
SECTION OF OTOLOGY: Aural Bacteriæmia..... 605

REVIEWS AND NOTICES OF BOOKS.

The Diagnosis and Treatment of Venereal Diseases in General Practice. By L. W. Harrison, D.S.O., Lieutenant-Colonel, R.A.M.C..... 606

Syphilis. By Loyd Thomson, M.D..... 606

The Conduction of the Nervous Impulse. By Keith Lucas, Sc.D., F.R.S..... 606

LEADING ARTICLES.

THE PROBLEMS OF NUTRITION. 607

THE BELGIAN DOCTORS' AND PHARMACISTS' RELIEF FUND. 608

ANNOTATIONS.

The Prevention and Treatment of Malaria..... 608

Present-Day Applications of Experimental Psychology..... 609

The Identification of the Meningococcus..... 609

The Early Diagnosis of Sciatica 610

The Incidence and Treatment of Amœbic Dysentery Carriers 610

Erythrœdema..... 611

THE SERVICES:
Royal Naval Medical Service. Army Medical Service — Royal Army Medical Corps.— Journal of the Royal Army Medical Corps..... 614

SPECIAL ARTICLES.

The Belgian Doctors' and Pharmacists' Relief Fund. — Subscriptions..... 615

URBAN VITAL STATISTICS:
English and Welsh Towns.... 620
Scotch Towns..... 620
Irish Towns..... 620

OBITUARY.

William Miller Crowfoot, M.B. Lond., F.R.C.S.Eng., Honorary Consulting Surgeon to Beccles Hospital..... 621

George Rowell, F.R.C.S.Eng., Senior Anæsthetist to Guy's Hospital..... 621

CORRESPONDENCE.

Botulism (Dr. A. W. J. MacFadden)..... 615

Acute Infective Ophthalmoplegia or Botulism (Dr. Leonard Dobson)..... 615

Toxic Bulbar Paralysis (Possibly Botulism) (Dr. H. J. McCaw, Dr. J. R. Perdrau, Dr. G. F. Stebbing)..... 616

Toxic Encephalitis (Dr. E. Farquhar Buzzard)..... 616

Tuberculosis in Dublin (Sir John W. Moore)..... 617

The Prevention of Measles Mortality (Dr. R. King Brown)..... 617

The Treatment of Acute Gas Cases (Dr. Thomas D. Lister). 617

Ether Clonus (Lieutenant J. B. H. Holroyd, R.A.M.C.). 618

The Parliamentary Representation of the Combined Universities (Sir W. M. Abbot Anderson, Mr. Herbert G. Williams)..... 618

Artificial Frost-Bite (Mr. Norman C. Lake)..... 618

The Medicine of the Stage (Mr. R. W. Starkie)..... 625

Professional Diseases: the Newest Pathology..... 625

THE WAR.

The Casualty List..... 619

Casualties among the Sons of Medical Men..... 620

The Honours List..... 620

Foreign Decorations..... 620

Mentioned in Despatches..... 620

Fourth-Year Students for the Army..... 620

OBITUARY OF THE WAR:
James Robertson, M.D., Ch.M. Aberd., Lieutenant-Colonel, Royal Army Medical Corps.— —(*With Portrait*)..... 619

Bernard Gordon Beveridge, M.B., Ch.B.Aberd., Military Cross, Captain, Royal Army Medical Corps.—(*With Portrait*)..... 619

Edward Charles Cunnington, M.R.C.S.Eng., Captain, Royal Army Medical Corps..... 620

MEDICAL NEWS.

Indian Medical Service..... 604

An Epidemic of Obscure Origin 611

Central Midwives Board..... 612

Royal Faculty of Physicians and Surgeons of Glasgow and the Proposed Ministry of Health..... 615

Medico-Psychological Association..... 620

Royal Medical Benevolent Fund 62

Queen Charlotte's Hospital, London..... 621

Donations and Bequests..... 623

St. Thomas's Hospital Medical School (University of London) 623

Puerperal Fever in Tasmania... 623

PARLIAMENTARY INTELLIGENCE.

Notes on Current Topics: The Military Service Act.— The Budget..... 622

House of Commons: Medical Examination of Attested Men. — Treatment of Discharged Soldiers in Ireland.— Medical Standards of Military Fitness. — Territorial and Reserve Medical Officers.— Sanitary Services in Large Towns.—Medical Examinations under the Military Service Act.—Ozone Treatment of Cases of Gassing.— A Ministry of Health.—Provision of Sanatoria.—Medical Treatment of Soldiers' Wives. Soldiers and Vaccination.— The Medical Service in France..... 622

NOTES, SHORT COMMENTS, &c.

In the Footsteps of Hooker..... 625

A New Medicine Pocket-Case... 626

The Link Between School Inspection and Industrial Hygiene..... 626

Lectures for Intending Baby Week Speakers..... 626

"The Future of Dried Milk"... 626

A Plea for Polypharmacy..... 626

Medical Diary..... 624

Appointment..... 624

Vacancies..... 624

Births, Marriages, and Deaths.. 624

Meteorological Readings..... 624

Books, &c., received..... 624

Editorial Notices..... 625

Acknowledgments of Communications received..... 625

Manager's Notices..... 625

Local Anæsthesia: An Illustrated Text-Book for Students and Practitioners. Roy. 8vo. Pp. 193. Price 8s. 6d. net; postage 6d.

The Animal Parasites of Man. By H. B. FANTHAM, M.A.Cantab., J. W. W. STEPHENS, M.D. Cantab., and F. V. THEOBALD, M.A. Cantab. Roy. 8vo. Cloth. Pp. 932. 423 Illustrations. 45s. net; postage 9d. inland.

The Internal Secretory Organs: their PHYSIOLOGY & PATHOLOGY. By Prof. ARTHUR BIEDL. Preface by LEONARD WILLIAMS, M.D. 21s. net; postage 6d.

Clinical Surgical Diagnosis for STUDENTS AND PRACTITIONERS. By Prof F. DE QUERVAIN. 2nd English Edition. Translated by J. SNOWMAN, M.D. 862 pp. 604 Illustrations and 5 Col. Plates. Roy. 8vo. 35s. net; postage 7d.

JOHN BALE, SONS & DANIELSSON, Ltd., 83, 85, 87, 89, & 91, Gt. Titchfield St., Oxford St., London, W.1.

MACMILLAN & CO.'S NEW BOOKS.

Fibroids and Allied Tumours (Myoma and Adenomyoma):
Their Pathology, Clinical Features and Surgical Treatment. By **CUTHBERT LOCKYER**, M.D., B.S., F.R.C.P., F.R.C.S., Joint Editor of "The New System of Gynæcology." With an Introductory Notice by ALBAN DORAN, F.R.C.S., Consulting Surgeon to the Samaritan Free Hospital for Women. With 316 Illustrations, including 37 Coloured Plates. Super royal 8vo. **63s.** net.

Hysterical Disorders of Warfare. By **LEWIS R. YEALLAND**, M.D., Resident Medical Officer, National Hospital for the Paralysed and Epileptic, Queen-square. With Preface by E. FARQUHAR BUZZARD, M.D., F.R.C.P., Lieut.-Colonel, R.A.M.C. 8vo. **7s. 6d.** net.

MACMILLAN & CO., Ltd., London, W.C. 2.

JUST PUBLISHED. Demy 8vo. **8/-** net. Fully Illustrated.

The Fitting-out and Administration of a
NAVAL HOSPITAL SHIP

By **EDWARD SUTTON,** Fleet Surgeon R.N., S.M.O. R.N. Hospital Ship "Plassy"; late S.M.O. R.N. Hospital Ship "Drina."

Records a description of the conversion of the S.S. "Drina," and also full details of the administration of a Hospital Ship, together with the organization or working of the ship.

BRISTOL: JOHN WRIGHT & SONS LTD. **LONDON: SIMPKIN, MARSHALL & CO. LTD.**

STAMMERING
W. J. KETLEY, "Tarrangower," Brondesbury, N.W.
(30 years colleague of late B. BEASLEY, Brampton Park, Huntingdon.)
Those interested in the subject should write for his book, which will be sent post free.

STAMMERING
MOST SUCCESSFULLY TREATED.
RESIDENT AND DAILY PUPILS.
PROSPECTUS AND MEDICAL OPINIONS POST FREE FROM
Mr. A. C. SCHNELLE,
Estd. 1905.] 119, Bedford Court Mansions, London, W.C.

ALCOHOL:
ITS ACTION ON THE HUMAN ORGANISM.
In view of the great demand for this work, a New Edition has been prepared, and copies can be obtained, price **1s.** net, or post free 1s. 2d., from any Bookseller, or from H.M. Stationery Office at the undermentioned addresses:—
Imperial House, Kingsway, London, W.C. 2,
AND
23, Forth Street, Edinburgh.

PEPTENZYME
The Nucleo-Enzymes of the Salivary, Peptic, Pancreatic, Spleen and Intestinal Glands.
In Catarrh Atonic Dyspepsia, &c.
Assists the Digestive organs to resume their functions by starting normal active digestive secretion, which may require only a slight impulse by proper stimulation of the surfaces and orifices of the gland cells and of the ducts leading to the digestive canal.
Bottles 110 Tablets. Powder 1¼ ozs.
Elixir 8 and 16 ozs.

PROTONUCLEIN
The unchanged Nucleo Plasm of the glandular cells with the surrounding protoplasm, indicated in those conditions where cellular activity is lowered, such as after fevers and sickness.
In bottles of 100 Tablets. Powder, &c., 1 oz.

NEPHRITIN
IN BRIGHT'S DISEASE.
Nephritin is the vital substance or the grains of segregation of the cells of the cortex, including those of the convoluted tubules of fresh young pig's kidney. Nephritin is **not** a dried extract or desiccation, but is a distinct product. 10 Tablets of Nephritin equal the maceration of one pig's kidney weighing 150 grammes.
In bottles 80 Tablets.

REED & CARNRICK
JERSEY CITY, N.J.,
Distributing Agents.

Free Sample Supplied **ANGLO-AMERICAN PHARMACEUTICAL COMPANY, Ltd., CROYDON.** 718 Telephone: Croydon (Nat.)

Illustrations OF THE AGGLUTINATION METHOD OF DIAGNOSIS IN TRIPLE INOCULATED INDIVIDUALS.

BY H. MARRIAN PERRY, L.R.C.P., L.R.C.S. IREL.,
CAPTAIN, ROYAL ARMY MEDICAL CORPS, NO. —— STATIONARY HOSPITAL, B.E.F.

With a Note by

COLONEL SIR WILLIAM LEISHMAN, C.B., F.R.S., K.H.P., A.M.S.,
ADVISOR IN PATHOLOGY, B.E.F.

THE diagnosis of infection with one or other of the enteric group of organisms has become more and more complex during the last few years from both the clinical and laboratory standpoint owing to the introduction of preventive inoculation. Clinically this group of diseases has become in certain cases so profoundly modified as to be recognised only with the greatest difficulty. From the laboratory point of view the introduction of preventive inoculation with T.A.B.* vaccine has presented new problems which have had to be overcome.

CHANGES CAUSED BY T.A.B. INOCULATION.

In the earlier days of the war the mixed vaccine of typhoid and paratyphoid organisms was not employed, and the immunity developed by preventive inoculation had therefore not been attained in regard to either of the paratyphoid fevers. Consequently these cases were more or less clinically typical in their manifestations, and diagnosis gave the bacteriologist less difficulty. This is illustrated in the appended table, which gives the results of bacteriological examination of blood, fæces, and urine in a series of 1310 cases of the enteric group infection. This series extended from the beginning of the war until the introduction of inoculation with the triple vaccine in 1916.

TABLE I.

Disease.	No. of cases examined.	No. of cases in which organism was isolated.	Analysis of bacteriological examinations. Blood. No. of cases examined.	Blood. No. of cases in which organism was isolated.	Fæces. No. of cases examined.	Fæces. No. of cases in which organism was isolated.	Urine. No. of cases examined.	Urine. No. of cases in which organism was isolated.
Typhoid	531	297	450	297	295	45	139	12
Paratyphoid A	158	107	146	87	100	25	77	7
Paratyphoid B	511	374	439	150	429	241	347	36

It will be seen that a positive diagnosis by isolation of the organism from the blood, fæces, or urine could be hoped for in a large percentage of cases. In those cases of paratyphoid fevers in which the bacteriological examinations gave a negative result an agglutination test presented little difficulty in determining the diagnosis, as inoculation agglutinins for these organisms did not exist in the patients' serum.

The change brought about by preventive inoculation with T.A.B. vaccine is striking, not only from the clinical but also from the laboratory point of view. Clinically this group of diseases has assumed an entirely aberrant form, and may vary from a 48-hours' pyrexia to an illness extending over as many days. Symptoms which have been common to the older type of case either no longer exist or have become so modified as to make diagnosis extremely difficult. The mortality has been so diminished that a post-mortem examination on a case of enteric fever has become exceedingly rare. On the laboratory side the recovery of the organism from the blood, fæces, or urine is rather the exception than the rule. In a recent series of 2010 cases not more than 20 per cent. were proved by isolation of the organism from the fæces or urine. Blood culture can no longer be counted on to yield a positive diagnosis to the same extent as in former days. Particularly is this the case in base hospitals, where the patient arrives at a period of his illness when positive blood culture could not be hoped for. Attempts at early blood culture carried out by mobile laboratories have met with as little success. The only member of the group which can still be isolated from the stools or urine to any appreciable extent is *B. paratyphosus B*, but even with this organism positive stool and urine culture has very much diminished.

THE AGGLUTINATION TEST.

The value of a test such as the agglutination test, which can be applied to every case, even late in the disease, and which can give proved accuracy of its results, becomes under these circumstances much enhanced. If a positive diagnosis is dependent solely on isolation of the causal organism from the blood, fæces, or urine the opinion expressed as a result of these examinations would, in the majority of cases, be a negative one and would be of little or no value. Recent literature which has appeared on the subject of the diagnosis of enteric group infection by means of the agglutination test has made it increasingly evident that the tendency is to regard the complexity created by the introduction of the T.A.B. vaccine such that reliance cannot be placed on a diagnosis based on its results. Admittedly a single estimation of agglutination titre, by whatever method determined, is of no value in the diagnosis of these cases. Table II. shows the variation in titre observed in 20 consecutive cases admitted to hospital with pyrexia as "suspect enterics," but which on examination were negative both clinically and bacteriologically as regards an enteric group infection.

It is evident that the variability in agglutinin content in these cases is dependent on several factors. 1. The length of time that has elapsed since the administration of the vaccine. 2. The dose of the vaccine given. 3. The value of the vaccine as an antigen. 4. The individual response in the production of antibody which must necessarily be variable.

TABLE II.—*Illustrating Variability in Agglutination Titre in T.A.B. Inoculated Cases which were Negative Clinically and Bacteriologically for Enteric Infection.*

No.	Inoculation.	Date of exam.	Agglutination titre in dilutions. *B. typh.*	*B. para. A.*	*B. para. B.*
1	T.V. 2, Oct., 1914; T.A.B./1, Aug., 1916.	25-1-17.	560	150	35
2	T.A.B. 1, April, 1916.	19-6-17.	70	10	35
3	T.A.B. 3, March, 1916.	25-4-17.	250	12·5	100
4	T.A.B. 1, Nov., 1916.	6-2-17.	290	140	0 in 25
5	T.A.B. 2, Dec., 1916.	24-2-17.	1900	0 in 12·5	100
6	T.A.B. 2, Nov., 1916.	1-3-17.	125	230	25
7	T.A.B. 2, July, 1917.	9-8-17.	30	30	25
8	T.V. 1, Jan., 1915; T.A.B. 2, July, 1916.	17-1-17.	400	90	70
9	T.A.B. 2, June, 1916.	11-1-17.	300	70	0 in 25
10	T.A.B. 2, Feb., 1916.	9-6-17.	140	0 in 5	0 in 12·5
11	T.A.B. 2, April, 1916.	28-12-16.	700	140	170
12	T.V. 3, Feb., 1916; T.A.B. 1, Jan., 1916.	21-6-17.	140	12·5	40
13	T.A.B. 2, Nov., 1916.	6-7-17.	220	35	50
14	T.A.B. 2, March, 1916.	10-3-17.	140	200	100
15	T.A.B. 2, June, 1916.	22-1-17.	400	70	40
16	T.A.B. 1, Sept., 1916.	27-5-17.	50	100	40
17	T.V. 2, 1914; T.A.B. 2, Nov., 1916.	9-1-17.	500	50	280
18	T.V. 2, Sept., 1914; T.A.B. 2, May, 1917.	16-6-17.	290	140	10
19	T.A.B. 2, March, 1917.	22-4-17.	220	290	150
20	T.A.B. 2, March, 1917.	7-7-17.	1130	290	1180

Dreyer, Ainley Walker, and Gibson have pointed out that in inoculated individuals a diagnosis could still be arrived at if the agglutination test were repeated at suitable intervals in order to ascertain if there were any marked changes in titre as were known to accompany an active infection. The technique adopted was that introduced by Dreyer, employing the macroscopic method in association with standardised agglutinable cultures. It is necessary here to state the conclusions they arrived at.[1]

1. Inoculated persons, if quite recently inoculated, will usually show a high titre of specific agglutination. A rapid rise in titre (for each bacillus in the case of the triple vaccine) sets in within a few days of inoculation. A maximum is reached, followed by a fall at first rapid, but subsequently becoming very slow, so that a relatively high titre may be maintained for a long period (even for years). During this period examinations made at intervals of a few days give practically identical readings.

2. When an inoculated individual suffers from an attack of enteric fever his titre of agglutination for the bacillus concerned (*typhosus*, *paratyphosus A*, or *paratyphosus B*) will exhibit the usual rise and subsequent regular fall seen in non-inoculated subjects, but starting

* A mixture of vaccines designed to protect against (T) Typhoid, (A) Paratyphoid A, and (B) Paratyphoid B.

from and returning towards the higher base line of inoculated persons. Meanwhile one of three things may occur as regards the agglutinin titres of his serum for other members of the group against which he has been protectively inoculated.

(*a*) No appreciable rise may occur in the titres.

(*b*) A relatively slight rise may occur, followed by a fall towards their former level.

(*c*) A marked rise may occur approximately synchronous with or somewhat antecedent to the rise in agglutinin titre for the infecting bacillus, and subsequently followed by the usual fall.

3. The maximum of the curve of specific agglutinin formation accompanying enteric infection in man occurs between the sixteenth and the twenty-fourth day of the disease, and most frequently from the eighteenth to the twentieth day. And, so far as experience at present goes, a change of titre of even only 100 or 200 per cent. proceeding regularly in the usual curve and passing its maximum within the period named justifies a diagnosis of enteric infection. It will, of course, most commonly be found that the maximum has occurred in the interval between two successive observations.

How far these conclusions are correct or what is the margin of error in the interpretation of the results obtained by their technique is not the subject of this contribution; but since the method has been used as a routine examination of all cases of pyrexia admitted to this hospital as "suspect enteric" it is thought that publication of examples of some of the results seen in triple inoculated cases would be of interest. At this time it is not possible, from pressure of other work, to analyse the mass of records which have accumulated, and no attempt has been made to do so. Cases are, however, put forward with the view of emphasising the value of the test as an aid in the diagnosis of pyrexias of unknown origin. They are selected with the view of illustrating that the difficulties of applying this method of diagnosis to patients who have been inoculated with a T.A.B. vaccine are not as great as have been suggested, and that as an aid to diagnosis agglutination will give most valuable help.

Technique.

The technique as outlined in the "Directions"[2] issued from the Department of Pathology, University of Oxford, on behalf of the Medical Research Committee has been followed in all its details. The agglutination titre of each patient's serum to *B. typhosus*, *B. paratyphosus A*, and *B. paratyphosus B* was tested at intervals of approximately four days. The serum of all triple inoculated cases coming under investigation for the first time was tested in dilutions of 1 in 50, 100, 250, and 500. When no agglutination was evident in this series, or when an "end-point" had not been reached, the test was repeated with the serum appropriately diluted, the relative ratio of progression of dilutions in the new series being maintained. The tubes were examined after incubation at from 50° to 55° C. for two hours in a water bath, followed by 15 minutes' standing at room temperature.

A few points in connexion with the technique that are of importance might be emphasised. First, it is very necessary to obtain a sufficient supply of serum. It has been the practice in this hospital to collect the blood in all cases by vein puncture. Enough is thus obtained to obviate the annoyance arising from an inadequate supply when the test on the same blood has to be repeated. Further, attempts to make a small quantity of serum suffice may give rise to error owing to the possible admixture of red cells, which gives rise to a pseudo-agglutination. Secondly, all necessary precautions must be taken to prevent hæmolysis which will give rise to errors in the determination of the "end-point." Thirdly, it must be emphasised that in this laboratory none of the technique was left to orderlies. Few, if any of them, possess sufficient patience or interest in the cases to ensure accuracy of results. Lieutenant-Colonel Dreyer has suggested that the whole of the technique can readily be carried out by the ordinary skilled laboratory attendant. From experience of results obtained in other laboratories in France it would appear that the committal of the agglutination test to their care seriously prejudices the results obtained.

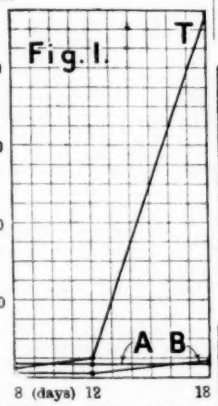


Fig. I.

Readings.

All the readings were made by artificial light against a black background. The grade of agglutination in each tube of the series was noted, and the readings were repeated at the end of 24 hours. The second readings served as a control to the 2-hour results, and obviated any errors caused by inhibition phenomena. The highest dilution at which definite flocculent agglutination (without sedimentation) could be detected by the naked eye was recorded as standard agglutination. Owing to the rate at which the dilution increases in the series it commonly happened that no tube showed standard agglutination. In such cases by noting the degree of agglutination present in each tube and using the interpolation table published by Dreyer and Inman[3] the end-point was calculated. It was found of help to keep a complete record of the readings of every tube put up in the various examinations made during the course of the disease. In this way it was possible to make a critical survey of the results on the conclusion of the case.

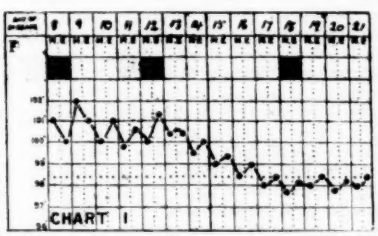
Method of Recording Results.

In the cases recorded the results of the agglutination tests are expressed as agglutinin units. In the "Directions" supplied the standard agglutinin unit is defined as being that amount of agglutinating serum which when made up to 1 c.cm. volume with normal saline solution causes standard agglutination on being mixed with 1·5 c.cm. of the original standard agglutinable culture and maintained at 55° C. for two hours in a water bath followed by 15 minutes at room temperature. The dilution of the serum at which standard agglutination occurs divided by the factor of sensitivity of the particular emulsion used in the test gives the number of standard agglutinin units contained in 1 c.cm. of the serum examined.

In the following cases examples of typhoid, paratyphoid A, and paratyphoid B fevers are recorded, which, firstly, have been proved by isolation of the infecting organism. Secondly is presented a series of cases which have exhibited a clearly defined diagnosis by agglutination, together with some examples of lower titre results. Thirdly, two cases are shown, which, although considered enteric group infections on clinical grounds, could not be diagnosed by the agglutination test or by bacteriological finding. The cases included under "Diseases other than Enteric" have been selected with the view of demonstrating that alteration in agglutination titre in such cases does not occur to such an extent as would give rise to errors in diagnosis.

It may be mentioned that when the work on this series of cases was carried out subsequent publication of the results was not contemplated, the cases being only subjected to ordinary laboratory routine examination; hence in many of the cases only the three examinations necessary to establish the diagnosis were made. Moreover, the clinical notes of the case were not examined until after their selection as examples of agglutination results.

It will be noted that the rise and fall in titre of agglutinins has been represented graphically by straight lines. The reason for so presenting them is that daily examination of the agglutinin content was not made, and therefore the data for forming a curve were not available.



A study of these cases will make it plain that the patients have come under observation at very variable periods of their illness. In many cases they were admitted to this hospital in the afebrile stage. Where any record of previous temperature was available its course has been shown on the charts.

I. CASES PROVED BY ISOLATION OF ORGANISM.

(A) *Typhoid.*

CASE 1 (Fig. and Chart 1).—*Clinical data.*—Onset sudden on Oct. 16th, 1916. Fever, headache, and nausea. Admitted to field ambulance and transferred to base. History of pyrexia but no record. Came under observation on Oct. 23rd. Temperature: 101° F. Complaining of headache, pains in back, and abdominal tenderness. Pulse: Low tension and slow (68). Tongue: Thickly furred; slight tremor. Abdomen: Slightly tumid; reflexes sluggish. Spleen: Not enlarged. Spots: A few suspicious spots on abdomen and thorax.

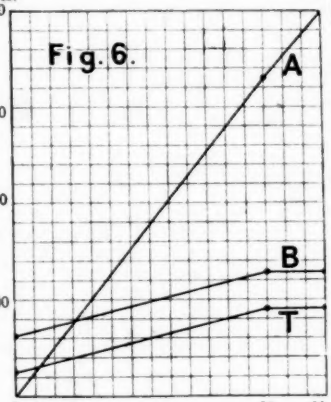
Bacteriological data.—Inoculation history: T.A.B./2, April, 1916. *B. typhosus* isolated from fæces twice. Blood culture negative.

Day of disease		T.	A.	B.	
8		10	19	9	Agglutinin units.
12		25	19	6	
18		465	20	23	

A marked reaction is evident in the typhoid agglutinin titre, the increase being 18-fold between the twelfth and eighteenth day of disease. The paratyphoid A titre is unaffected. The paratyphoid B titre shows a sympathetic rise.

CASE 2.†—*Clinical data.*—Onset on May 9th, 1917. Headache and pyrexia. Admitted to field ambulance. Provisional diagnosis of trench fever. Came under observation on May 18th. Temperature: 101°F. Headache, pains in legs and ankles. Pulse 84. Tongue: Very furred, clearing at margins; not tremulous. Abdomen: Not tumid. Spleen: Not tender or enlarged. Heart and lungs: Normal. Convalescence uneventful.

Bacteriological data.—Inoculation history: T.A.B./2, July, 1916. Examination of fæces: *B. typhosus* isolated twice. Examination of urine (2); negative for organisms of enteric group.



Day of disease		T.	A.	B.	
14		1075	14·5	120	Agglutinin units.
18		1833	14·5	130	
22		1130	13·5	81	

The titre of the typhoid agglutinins is high. The rise to the maximum (about the nineteenth day) and the commencing fall are evident. Paratyphoid A titre is low and unaffected. Paratyphoid B titre shows a slight rise and fall.

CASE 3.—*Clinical data.*—Gradual onset about June 7th, 1917. Pyrexia, bronchitis, headache, and abdominal pains. Came under observation on July 2nd. Temperature 104° F. General condition grave; very toxic; slightly delirious. Tongue: Dry, brown, tremulous. Abdomen: Tumid. Spleen: Distinctly palpable. Spots: Typical on chest and abdomen. Condition gradually became worse. Patient became collapsed and died on July 16th.

Bacteriological data.—Inoculation history: T.A.B./2, September, 1916. Examination of fæces (3): Negative for organisms of enteric group. Examination of urine (3): Negative for organisms of enteric group.

Day of disease		T.	A.	B.	
27 ...		265·5	25	Less than 1	Agglutinin units.
31 ...		583	30	Less than 1	
37 ...		300	25	Less than 1	

Autopsy.—*B. typhosus* isolated from the bile. Extensive ulceration with perforation at ileo-cæcal junction.

It was difficult to obtain accurate information of the onset of illness in this case. It will be noted that the maximum titre of the typhoid agglutinins occurred about the thirtieth day. The paratyphoid agglutinins were low and showed no change. No paratyphoid B agglutinins were evident.

CASE 4.—*Clinical data.*—Onset on Jan. 15th, 1917, with diarrhœa and fever. Came under observation on Jan. 21st, being admitted as "suspect dysentery." Temperature: Then 104·4° F.; delirious. Tongue: Dry, furred, tremulous. Abdomen: Distended and tympanitic. Spleen: Not noted as being enlarged. Spots: Nil. Condition gradually became worse and patient died on Jan. 26th.

Bacteriological data.—Inoculation history: T.A.B./2, June, 1916. Blood culture (Jan. 26th, 1917): *Bacillus typhosus* isolated. Examination of fæces (2): Negative for organisms of enteric group. Examination of urine (2): Negative for organisms of enteric group.

Day of disease		T.	A.	B.	
8		8·3	16	21	Agglutinin units.
12		73·0	51	41	

Two agglutination tests could only be made before death, but the result suggested a typhoid infection. The low titre of the typhoid agglutinins on the first estimation is evident. The subsequent steep rise cuts the curves of the paratyphoid A and B agglutinins, which also show a marked stimulation.

Autopsy.—Spleen enlarged. The Peyer's patches of the lower part of the ileum were markedly raised and congested. There was no ulceration. *B. typhosus* was isolated from the bile and the spleen.

(B) *Paratyphoid A.*

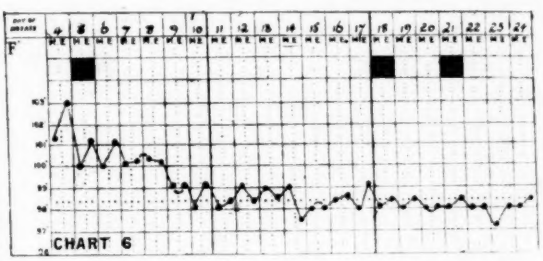
CASE 5.—*Clinical data.*—Previously to reporting sick, patient had been feeling unwell for ten days with lassitude, anorexia, and slight headache. Reported sick on May 1st, 1916, obviously ill, with temperature 103° F.; some diarrhœa. Tongue: Dry, rough, slightly furred. Abdomen: Tumid, abdominal muscles very wasted. Spleen: Enlarged and tender. Spots: Several typical ones present. Heart and lungs: Normal. Pulse: Slow and very soft. Apparently a rather severe case of paratyphoid A fever. Convalescence prolonged.

Bacteriological data.—Inoculation history: T.V. 1, December, 1915; T.A.B./2, March 3rd, 1916. *B. paratyphosus A* isolated from the fæces on two occasions. Examination of urine: Negative for enteric group organisms.

Day of disease		T.	A.	B.	
25		6·1	3·0	35·0	Agglutinin units.
29		6·1	7·3	27·0	
35		15·7	150·0	44·5	

In this case there is a marked rise in the agglutinins for paratyphoid A later than the period of expectation. The variation in the agglutinins for typhoid and paratyphoid B is comparatively very slight.

CASE 6 (Fig. and Chart 6).—*Clinical data.*—Sudden onset on August 8th, 1916, with vomiting, severe headache, pains in the stomach, back, and legs. Temperature 103° F. Came under observation



on August 23rd. Temperature: Normal. Tongue: Slightly furred. Abdomen: Tumid, moved easily, but tender. Spleen: Easily palpable. Spots: One or two suspicious spots present. Heart and lungs: Normal. Pulse: Slow. Convalescence uneventful.

Bacteriological data.—Inoculation history: T.V./1, Jan. 21st, 1916; T.A.B 2, Jan. 31st. Blood culture (August 12th): Negative. Paratyphoid A bacillus isolated from fæces (August 27th). Examination of urine (3): Negative for enteric group organisms.

Day of disease		T.	A.	B.	
5		32·5	0	64	Agglutinin units.
18		92·5	330	129	
21		92·5	410	129	

There is a steep rise in the agglutinins, for paratyphoid A continued to the twenty-first day of the disease. A sympathetic rise in the agglutinins for typhoid and paratyphoid B is also noticed.

CASE 7.—*Clinical data.*—Came under observation on the twelfth day of the disease, feeling very weak, with headache and abdominal pains. Temperature: 101·5° F. Tongue: Moist, slightly furred. Abdomen: Tumid and tender on palpation. Spleen: Easily felt. Spots: A few typical spots present. Heart and lungs: Normal. A moderately severe case of paratyphoid A fever with an uneventful convalescence.

Bacteriological data.—Inoculation history: T.V./2, December, 1915; T.A.B./2, March, 1916; T.A.B. 1, April, 1916. Blood culture (May 13th, 1916): Negative. Paratyphoid A bacillus isolated from fæces (May 14th). Examination of urine (3): Negative for enteric group organisms.

Day of disease		T.	A.	B.	
13		51	30·0	28·5	Agglutinin units.
17		61	36·5	71·0	
26		71	440·0	68·5	

Agglutinins for paratyphoid A rise steeply to their maximum on the twenty-sixth day of the disease. The typhoid and paratyphoid B curves show some rise.

(C) *Paratyphoid B.*

CASE 8.—*Clinical data.*—Onset on May 27th, 1916, with pains in the head, back, limbs, and abdomen. Patient tired and giddy. Temperature 101° F. Tongue: Furred, but moist. Abdomen: Tumid and slightly distended. Spleen: Neither palpable nor enlarged to percussion. Spots: Six or seven typical rose spots present on the abdomen and chest. Heart and lungs: Normal. Pulse 60, slow and soft. A mild but typical case of paratyphoid B fever with an uninterrupted convalescence.

Bacteriological data.—Inoculation history: T.A.B./1, March 20th, 1916. Paratyphoid B. bacillus obtained by blood culture (June 1st). Examination of urine (3): Negative for enteric group organisms. Examination of fæces: On three separate occasions *B. paratyphosus B* was isolated.

Day of disease		T.	A.	B.	
11		129	134	170	Agglutinin units
15		174	175	3571	
19		153	134	3657	
23		157	134	3143	

In this case (in which *B. paratyphosus B* was isolated on three occasions) the agglutinins for that organism show an extremely sharp and rapid rise, attaining the maximum about the nineteenth day of the disease. The subsequent fall in agglutinins is typical. The agglutinins for typhoid and paratyphoid A are, in comparison, scarcely affected.

CASE 9 (Fig. and Chart 9).—*Clinical data.*—Onset on April 26th, 1916, with frontal headache, abdominal pain, and diarrhœa. When coming under observation had some bronchitis. Temperature: 102° F. Tongue: Much furred. Abdomen: Tumid, with tenderness under the left costal margin. Spleen: Palpable. Spots: Typical, but few. Pulse: Dicrotic; blood pressure low. Convalescence uneventful.

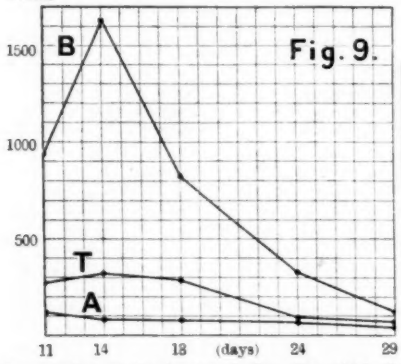
Bacteriological data.—Inoculation history: T.V. 2, April 15th, 1915; T.A.B./1, Feb. 28th, 1916. Blood culture negative. Examination of

† Graphs and charts were supplied by the author with each case, but only representative charts are reproduced here.

urine (3): Negative for enteric group organisms. *B. paratyphosus B* was obtained on two occasions from the fæces.

Day of disease	T.	A.	B.	
11	263	104	921	Agglutinin units.
14	306	75	1628	
18	285	75	814	
24	82	48	328	
29	57	44	114	

This case well illustrates the agglutinin response to an enteric infection. The maximum production of agglutinins for paratyphoid B is reached about the fourteenth day, after which there is a rapid fall in titre for this organism. Typhoid agglutinin production is simultaneously stimulated, but to a much less degree, whilst the agglutinins for paratyphoid A are comparatively little affected.



CASE 10.—*Clinical data.*—Onset sudden on May 23rd, 1916, with dizziness, headache, pains in the limbs and back, with general malaise. Came under observation on May 26th, 1917, complaining of headache, nausea, and abdominal pain. Temperature 103·4° F. Pulse: Slow and dicrotic. Tongue: Thick grey fur, tremulous. Abdomen: Tumid and tender. Spleen: Not noted. Spots: Nil. Heart and lungs: Some bronchitis. A toxic case, convalescence being delayed by thrombosis of the left femoral vein.

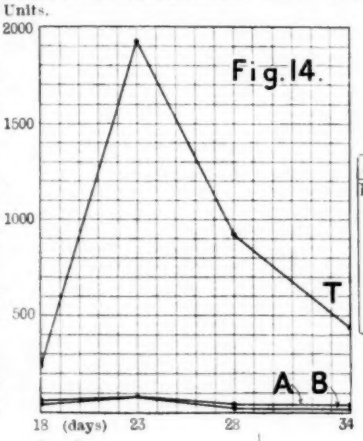
Bacteriological data.—Inoculation history: T.A.B./1, 1916; T.V. 2, 1915. Blood culture: *B. paratyphosus B* isolated (May 27th, 1916). Examination of fæces: *B. paratyphosus B* isolated on four occasions. Examination of urine: Negative for enteric group organisms.

Day of disease	T.	A.	B.	
5	22·2	>1	17·5	Agglutinin units.
15	126·0	>1	4285·0	
24	266·0	>1	3240·0	
32	266·0	>1	1700·0	

A very marked response in the paratyphoid B agglutinins, which is characteristic of toxic cases. The maximum of the rise occurs somewhere between the fifteenth and twenty-fourth days, probably about the nineteenth day. The subsequent fall by the thirty-second day is shown by the fourth examination. The typhoid inoculation agglutinins show the rise common in paratyphoid B infections. No agglutinins were evident for paratyphoid A.

CASE 11.—*Clinical data.*—Onset on August 1st, 1917, with headache, anorexia, and dizziness. History of palpable spleen. Came under observation on August 8th, complaining of headache and looking toxic. Temperature 101° F. Pulse 80, not dicrotic. Tongue: Moist, marked tremor, not furred. Abdomen: Slight tumidity; reflexes absent. Spleen: Palpable and tender. Spots: Nil. Heart and lungs: No abnormality. Convalescence uneventful.

Bacteriological data.—Inoculation history: T.A.B./2, May, 1916. Examination of urine (3): Negative for enteric group organisms. *B. paratyphosus B* isolated twice from fæces.



Day of disease	T.	A.	B.	
14	24·5	>1	6	Agglutinin units.
17	28·0	>1	23	
19	21·5	>1	26	

The typhoid agglutinins are at a higher level than those of paratyphoid B on the fourteenth day of the disease, and show a further slight rise on the seventeenth day. The paratyphoid B agglutinins, although low in titre, exhibit a definite rise and cross the curve of the typhoid agglutinins by the twentieth day of the disease. No agglutinins evident for *B. paratyphosus A.*

II. CASES PROVED BY AGGLUTINATION.

(A) *Typhoid.*

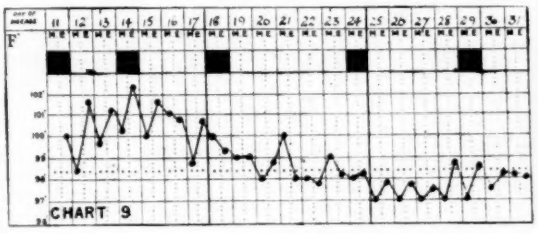
CASE 12.—*Clinical data.*—Onset sudden on Feb. 15th, 1917. Headache and general malaise. Temperature 100° F. Came under observation on Feb. 23rd. Then complained of slight headache and cough. History of pyrexia for eight days. Temperature: Now normal (no previous record). Pulse 80. Tongue: Moist, furred, tremulous. Abdomen: Nothing abnormal noted. Spleen: Not palpable or tender. Spots: Nil. Heart and lungs: Normal. Convalescence uneventful.

Bacteriological data.—Inoculation history: T.A.B./1, Sept. 25th, 1916. Examination of fæces (3): Negative for enteric group organisms. Examination of urine (3): Negative for enteric group organisms.

Day of disease	T.	A.	B.	
10	750	78	33	Agglutinin units.
14	1212	70	35	
18	7000	86	35	

This case presents a steep rise in the typhoid agglutinins. There is no sympathetic rise in the agglutinins for paratyphoid A or B.

CASE 13.—*Clinical data.*—Sudden onset on Dec. 12th, 1916, with anorexia and headache. Constipated, but had mild diarrhœa a week previously. Came under observation on Dec. 26th. Then complaining of headache, pain over spleen. Temperature 100°. Pulse 84, soft and full. Tongue: Dry and furred. Spleen: Not appreciably enlarged. Spots: Nil. Heart and lungs: Normal. Convalescence uneventful.



Bacteriological data.—Inoculation history: T. A. B. 1, July 1st, 1916. Blood culture (Dec. 19th): Negative. Examination of fæces (3): Negative for organisms of enteric group. Examination of urine (3): Negative for organisms of enteric group.

Day of disease	T.	A.	B.	
17	10,666	88	20	Agglutinin units.
21	12,166	100	22·5	
25	8,400	88	21	

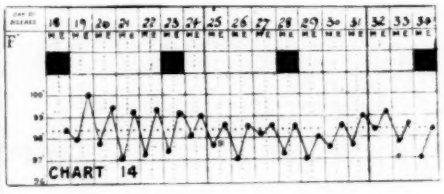
The diagnosis of typhoid is obvious. This case presents the rise of typhoid agglutinins to their maximum (probably on the twenty-first or twenty-second day). The examination on the twenty-fifth day illustrates the subsequent sharp fall. The paratyphoid A and B titres are low and are not affected.

CASE 14 (Fig. and Chart 14).—*Clinical data.*—Onset on Nov. 23rd, 1917, with vomiting, headache, and pains in limbs. Came under observation on Dec. 9th, 1916. Record of high temperature for the previous seven days. Complained of headache, pains in legs and back, and slight cough. Temperature 99° F. Pulse 80. Tongue: Dry, furred. Abdomen: Nothing noted. Spleen: Not palpable. Spots: A few rose-red spots. Heart and lungs: Normal. Convalescence uneventful.

Bacteriological data.—Inoculation history: T.A.B. 2, Sept. 3rd and 10th, 1916. Examination of fæces (3): Negative for enteric group organisms. Examination of urine (3): Negative for enteric group organisms.

Day of disease	T.	A.	B.	
18	249	43·5	64·9	Agglutinin units.
23	1923	91·0	94·5	
28	925	32·5	29·5	
34	440	32·5	29·5	

The steepness of the rise in the typhoid curve as it approaches its maximum (probably the twenty-third or twenty-fourth day) is well illustrated. The subsequent sharp fall, becoming more gradual, is also evident. The paratyphoid A and B agglutinins exhibit some slight rise.



(B) *Paratyphoid A.*

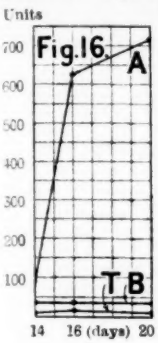
CASE 15.—*Clinical data.*—This patient was in hospital with a gunshot wound. After the wound had healed, and whilst the patient was awaiting his discharge, his temperature rose suddenly and he complained of pains in the head, back, and legs. Tongue: Slightly furred on dorsum. Abdomen: Not distended; reflexes brisk. Spleen: Not palpable. Spots: None seen. Heart and lungs: Normal. Pulse 76, regular and of low tension. A fairly severe case of paratyphoid A fever with an uninterrupted convalescence.

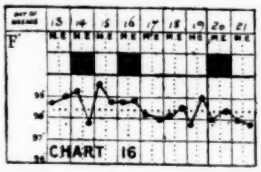
Bacteriological data.—Inoculation history: T.V. 2, July 26th, 1915; T.A.B./1, July 11th, 1916. Examination of fæces (3): Negative for enteric group organisms. Examination of urine (3): Negative for enteric group organisms.

Day of disease	T.	A	B.	
4	59	181	2	Agglutinin units.
9	54	460	2	
14	54	500	2	

There is a steep rise in the agglutinins for paratyphoid A, those for paratyphoid B and typhoid remaining unaffected.

CASE 16 (Fig. and Chart 16).—*Clinical data.*—Before coming under observation had felt unwell for ten days, with headache, constipation, giddiness, and general weakness. Reported sick on May 11th, 1917, complaining chiefly of headache and dizziness. Temperature 99·4° F. Tongue: Furred, moist, slightly tremulous. Abdomen: No distension, no tenderness. Spleen: Palpable. Spots: A few suspicious spots present. Heart and lungs: Normal. Pulse: Soft and slow. Convalescence uneventful.



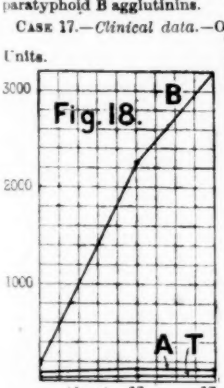


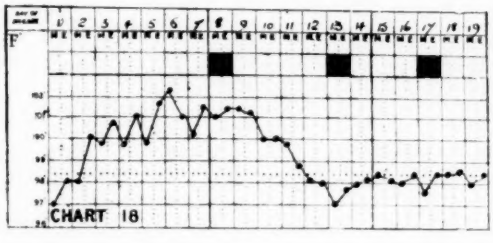
Bacteriological data.—Inoculation history: T.A.B. 1, June, 1916. Examination of fæces (4): Negative for enteric group organisms. Examination of urine (3): Negative for enteric group organisms.

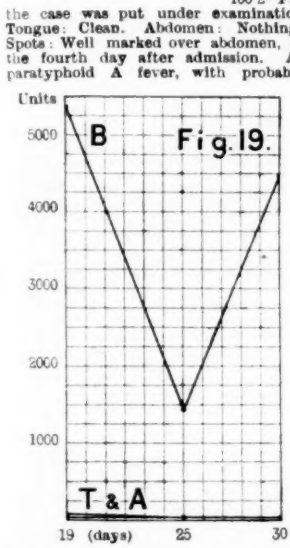
		T.	A.	B.	
Day of disease	14	16·6	95	32	Agglutinin units.
	16	23·2	625	32	
	20	11·8	715	32	

Shows a sharp rise in agglutinins for paratyphoid A, with a slight sympathetic rise in those for typhoid. There is no variation for paratyphoid B agglutinins.

CASE 17.—*Clinical data.*—Onset with diarrhœa on April 1st, 1917. There was some blood in the motions. Diarrhœa continued until April 13th. No record as to pyrexia during this period. Came under observation on April 22nd, being admitted as a "suspect dysentery." Temperature: Rose to 100·2° F. the day after admission, and the case was put under examination for enteric group infection. Tongue: Clean. Abdomen: Nothing noted. Spleen: Easily felt. Spots: Well marked over abdomen, chest, and arms. Epistaxis on the fourth day after admission. A moderately severe attack of paratyphoid A fever, with probably a relapse on the twenty-second day of the disease. No symptoms of dysentery whilst under observation. Convalescence uneventful.







Bacteriological data.—Inoculation history: T.A.B. 2, May, 1916. Examination of fæces (5): Negative for enteric group organisms. Examination of urine (5): Negative for enteric group organisms. Negative bacteriological and protozoological examinations for dysentery.

		T.	A.	B.	
Day of disease	29	17·0	32	34	Agglutinin units.
	33	18·5	35	34	
	37	84·0	810	34	

The diagnosis of paratyphoid A fever is evident. The paratyphoid A agglutinins show a sharp rise within three days. There is a sympathetic rise of the typhoid agglutinins. Paratyphoid B agglutinins are unaffected.

(C) *Paratyphoid B.*

CASE 18 (Fig. and Chart 18).—*Clinical data.*—Onset sudden, with severe diarrhœa, on April 18th, 1917. Diarrhœa lasted five days. History of blood and mucus in the stools. Admitted to hospital as "suspect dysentery" and came under observation on April 27th. Put under examination for enteric group infection. Patient toxic in appearance, complaining of headache and general malaise. There was no diarrhœa, temperature 100° F. on day after admission. Tongue: Dry and furred. Abdomen: Not tumid. Spleen: Not enlarged. Spots: Nil. Heart and lungs: Nothing abnormal. Clinically was an enteric group infection following on dysentery.

Bacteriological data.—Inoculation history: T.A.B. 2, June, 1916. Examination of fæces (4): Negative for enteric group organisms. Examination of urine (4): Negative for enteric group organisms. Bacteriological and protozoological examinations for dysentery negative.

		T.	A.	B.	
Day of disease	8	25	70	192	Agglutinin units.
	13	48	134	2258	
	17	58	134	3200	

A typical curve of an infection with *B. paratyphosus B.* The maximum of the paratyphoid B agglutinins had probably not been reached on the day of the last examination (seventeenth day of the disease). The typhoid and paratyphoid A agglutinins show a moderate sympathetic rise.

CASE 19 (Fig. and Chart 19).—*Paratyphoid B fever with a relapse on the twenty-fifth day.*—*Clinical data.*—Onset on Feb. 16th, 1917, with headache, bronchitis, and pyrexia. Temperature 103° F. Tongue: Dry and brown. Abdomen: Nothing noted. Spleen: Palpable and tender. Spots: Some spots on abdomen and chest. Heart and lungs: Bronchitis. Came under observation on Feb. 21st. Temperature then 101°. Spleen enlarged. Complained of cough and pain over the left side of the chest. Dullness over left base. Four ounces of fluid drawn off by paracentesis. Temperature normal on March 7th. Convalescent until the 12th, when a well-marked relapse occurred. Temperature again normal on the 21st, and convalescence uneventful.

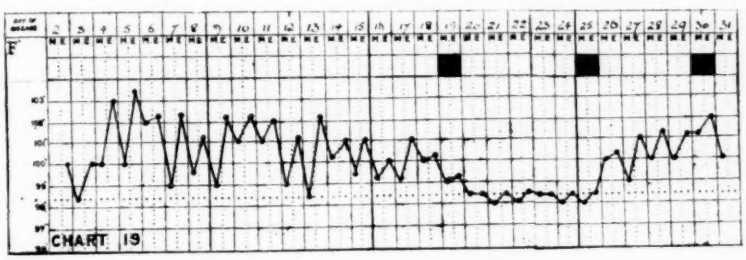
Bacteriological data.—Inoculation history T.V./2, February, 1915. T.A.B./2, August, 1916. Examination of fæces (4): Negative for enteric group organisms. Examination of urine (4): Negative for enteric group organisms.

		T.	A.	B.	
Day of disease	19 ...	27	33·8	5882	Agglutinin units.
	25 ...	30	18·0	1470	
	30 ...	30	20·0	4410	

The high titre of the paratyphoid B agglutinin was evident on the first examination. They showed a typical and rapid fall by the twenty-fifth day of the disease. The marked rise associated with the relapse is also evident. The typhoid and paratyphoid A agglutinins show little change.

CASE 20.—*Clinical data.*—Onset gradual, about Sept. 2nd, 1916, with general malaise, headache, and constipation. When first came under observation complained of chilliness, pain in the head, arms and back, and had been sick. Temperature 101° F. Pulse 80. Tongue: Furred. Abdomen: Distended but not tender. Spleen: Just palpable. Heart and lungs: Normal. A somewhat mild infection with uninterrupted convalescence.

Bacteriological data.—Inoculation history: T.A.B. 2, February, 1916. Blood culture negative. Examination of fæces (4): Negative for enteric group organisms. Examination of urine (4): Negative for enteric group organisms.



		T.	A.	B.	
Day of disease	12	150	85	691	Agglutinin units.
	16	475	170	3846	
	20	88	166	2300	

A typical illustration of a paratyphoid B infection. Agglutinins for this organism reach their maximum on the sixteenth day, those for paratyphoid A and typhoid being simultaneously stimulated. The subsequent fall in titre is most pronounced in the case of paratyphoid B, less marked in the case of typhoid, and scarcely noticeable in the case of paratyphoid A.

CASE 21.—*Clinical data.*—Onset gradual about August 10th, 1916, with pains in the head, back, and limbs, abdominal pain, and epistaxis. When coming under observation had a temperature of 104·5° F. Was slightly delirious and had diarrhœa. Tongue: Coated

with thick yellow fur. Abdomen: Distended and generally tender. Spleen: Palpable and tender. Spots: Several typical rose spots. Pulse: Slow and dicrotic. In the third week of his disease the patient developed a thrombosis of his left external iliac vein, for which he was treated with intravenous injection of sodium citrate. Convalescence was prolonged, but he ultimately made a good recovery.

Bacteriological data.—Inoculation history: T.A.B. 2, January, 1916. Examination of fæces (3): Negative for enteric group organisms. Examination of urine (3): Negative for enteric group organisms.

Day of disease		T.	A.	B.	
	13	53	3·9	250	Agglutinin units.
	17	97	3·9	930	
	21	72	8·4	1070	

Presents a sharp rise in agglutinins for paratyphoid B to their maximum about the twenty-first day of the disease. There is a comparatively slight stimulation of the typhoid agglutinins at the same time.

III. CASES OF LOWER TITRE PROVED BY AGGLUTINATION.

CASE 22.—*Clinical data.*—Onset gradual on June 13th, 1917, with pyrexia and headache. Came under observation on June 19th. Complained of headache and abdominal discomfort. Temperature 99·6° F. Pulse: Slow and dicrotic. Tongue: Dry, furred, tremulous. Abdomen: Nothing noted, reflexes marked. Spleen: Enlarged, not tender. Spots: Nil. Convalescence uneventful.

Bacteriological data.—Inoculation history: T.A.B. 2, November, 1916. Blood culture (June 19th): Negative. Examination of fæces (5): Negative for enteric group organisms. Examination of urine (5): Negative for enteric group organisms.

Day of disease		T.	A.	B.	
	13	49	36	32	Agglutinin units.
	18	50	36	28	
	22	94	36	36	

The case is an illustration of a curve of lower titre than the preceding. The sharp rise as the curve attains its maximum (about the twenty-second day) is evident. The paratyphoid A titre is steady. The paratyphoid B titre exhibits slight fluctuation, probably due to technical error.

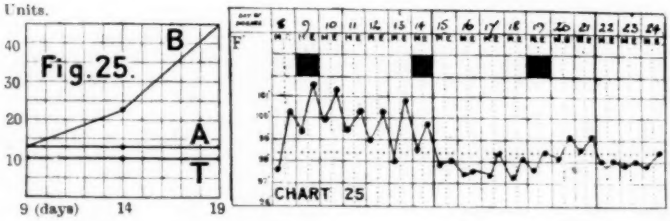
CASE 23.—*Clinical data.*—Admitted as a "suspect dysentery" on June 26th, 1917. History of diarrhœa. Convalescent until July 6th, when the temperature rose to 100° F. Put under examination for enteric group infection. Looked languid, complained of headache and general malaise. Pulse: Slow (63), not dicrotic. Tongue: Dry, furred, marked tremor. Abdomen: Tumid, reflexes active. Spleen: Palpable and very tender. Heart and lungs: Normal. Convalescence uneventful.

Bacteriological data.—Inoculation history: T.A.B. 2, March, 1917. Examination of fæces (3): Negative for enteric group organisms. Examination of urine (3): Negative for enteric group organisms. Bacteriological and protozoological examinations for dysentery negative.

Day of disease		T.	A.	B.	
	7	23	9·1	9·7	Agglutinin units.
	10	49	10·5	11·2	
	14	93	10 5	14·5	

Mild reaction of typhoid agglutinins, which showed a steady rise. Maximum not reached as no further examination was made after the fourteenth day. Paratyphoid A agglutinins steady. Paratyphoid B agglutinins show a slight tendency to increase.

CASE 24.—*Clinical data.*—Onset on July 20th, 1917, with headache, general malaise, and anorexia. The headache persisted for a week. Came under observation on July 29th. Constipation marked. General malaise. Temperature 101·4° F. Pulse: Slow (68), dicrotic. Tongue: Clean. Abdomen: Tumid, some tenderness. Spleen: Definitely palpable and tender for about a week. Spots: Nil. Heart and lungs: Normal.



Bacteriological data.—Inoculation history: T.A.B. 2, October, 1916. Examination of fæces (3): Negative for enteric group organisms. Examination of urine (3): Negative for enteric group organisms.

Day of disease		T.	A.	B.	
	15	15·5	23	16	Agglutinin units.
	19	33·0	130	39	
	23	33·0	91	39	

A mild case of paratyphoid A infection. The paratyphoid agglutinins exhibit a sixfold rise within four days, the subsequent fall after the nineteenth day being evident. The typhoid and paratyphoid B agglutinins show a rise synchronous with the rise in the paratyphoid A agglutinins, but to a markedly less extent.

CASE 25 (Fig. and Chart 25).—*Clinical data.*—Onset on July 5th, 1917, with chill, headache, pains in the back and legs, anorexia. History recorded of rose spots, palpable and tender spleen. Came under observation on July 12th. Temperature 99·4° F. Pulse 80, not dicrotic. Tongue: Furred, very tremulous. Abdomen: Tumidity marked, reflexes absent. Spots: Typical rose spots on abdomen. Heart and lungs: Normal.

Bacteriological data.—Inoculation history: T.A.B. 2, August, 1916. Examination of fæces (3): Negative for enteric group organisms. Examination of urine (3): Negative for enteric group organisms.

Day of disease		T.	A.	B.	
	9	10	12·5	13·0	Agglutinin units.
	14	10	12·5	22·5	
	19	10	12·5	45·0	

The paratyphoid B agglutinins are of low titre on the ninth day of the disease. The gradual rise, although still of low titre, on the nineteenth day of the disease is evident. The typhoid and paratyphoid A agglutinins maintain a low titre and are steady.

IV. CASES CONSIDERED NOT PROVED BY AGGLUTINATION BUT CLASSED CLINICALLY AS ENTERIC GROUP.

The two examples given below are of cases in which repeated bacteriological examination failed to isolate a member of the enteric group of organisms and where the agglutination readings were either absolutely level or showed such little alteration that a positive laboratory diagnosis was not justifiable. This type of case has become more common since the introduction of T.A.B. vaccine, and its significance will be discussed later.

CASE 26.—*Clinical data.*—Onset on August 4th, 1917, with headache, pains in the limbs, and fever. Came under observation on August 9th. Then complaining of headache, pains in the back and legs. Toxic appearance. Temperature 100° F. Tongue: Very furred, tremor marked. Abdomen: Tumidity marked, reflexes absent. Spleen: Easily palpable and tender. Spots: Several typical on abdomen and thorax. Pulse 80, regular, not dicrotic. Heart and lungs: Normal. Considered a typical case on clinical data. Convalescence uneventful.

Bacteriological data.—Inoculation history: T.A.B. 2, May, 1916. Examination of fæces (4): Negative for enteric group organisms. Examination of urine (4): Negative for enteric group organisms.

Day of disease		T.	A.	B.	
	7	6·8	12	>1	Agglutinin units.
	12	8·3	12	>1	
	17	8·3	12	>1	
	22	8·3	12	>1	

It will be noticed that the titre for *B. typhosus* and *B. paratyphosus A* is low and shows no variation up the twenty-second day of the disease. There were no agglutinins evident for *B. paratyphosus B.* A leucocyte count on the twenty-third day of the disease was as follows: Total count, 7500 per c.mm.; differential count, 500 cells; polymorphonuclears, 61·6 per cent.; lymphocytes, 26·6 per cent.; mononuclears, 8·6 per cent.; transitionals, 0·8 per cent.; eosinophiles, 2·0 per cent.; basophiles, 0·4 per cent.

CASE 27.—*Clinical data.*—Onset on July 25th, 1917, with headache, weakness, pains in legs. Spleen palpable. Rose spots. Temperature 102·5° F. Pulse 64. Came under observation on August 4th, complaining of headache, pains in the legs and back. Temperature 101·6°. Pulse 92. Tongue: Furred; tremor marked. Abdomen: Tumid; reflexes absent. Spleen: Palpable and tender. Heart and lungs: Normal. A further rise of temperature occurred on August 10th. This was accompanied by a fresh crop of typical typhoid spots. The case was considered a "typical enteric on clinical data."

Bacteriological data.—Inoculation history: T.A.B. 2, January, 1917. Blood culture on August 10th, 1917 (at height of temperature), negative. Examination of fæces (4): Negative for enteric group organisms. Examination of urine (4): Negative for enteric group organisms.

Day of disease		T.	A.	B.	
	12	8·3	3	>1	Agglutinin units.
	17	8·3	3	>1	
	22	8·3	3	>1	
	27	8·3	3	>1	

The agglutination readings for *B. typhosus* and *B. paratyphosus A* were absolutely steady and of low titre. No agglutinins were evident for *B. paratyphosus B.* A leucocyte count on the twenty-fifth day gave the following result: Total count, 7250 per c.mm.; differential count, 500 cells; polymorphonuclears, 56·4 per cent.; lymphocytes, 33·6 per cent.; mononuclears, 5·6 per cent.; transitionals, 0·8 per cent.; eosinophiles, 3·6 per cent.; basophiles, nil.

V. DISEASES OTHER THAN ENTERIC.

CASE 28.—*Miliary tubercle.—Clinical data.*—Onset on June 1st, 1917, with cough, pyrexia, and abdominal pain. Came under observation on June 16th with history of continuous pyrexia since the date of onset. Temperature 103° F. Pulse 80. Abdomen: Normal; reflexes brisk. Spleen: Not palpable. Spots: Nil. Lungs: A few moist râles over both bases. Examination commenced for enteric group infection. Pulmonary signs became more pronounced and the temperature continued high until death on July 30th.

Bacteriological data.—Inoculation history: T.A.B. 2, January, 1917. Examination of fæces (5): Negative for enteric group organisms. Examination of urine (4): Negative for enteric group organisms. Examination of sputum (5) for tubercle bacilli, negative.

Day of disease		T.	A.	B.	
	16	23·5	>1	51	Agglutinin units.
	20	23 5	>1	51	
	24	20·0	>1	48	
	30	23·0	>1	48	

The agglutinin titre for *B. typhosus* and *B. paratyphosus B* remained steady throughout the disease, no agglutinins being evident for *B. paratyphosus A.*

Autopsy.—This revealed a widespread tuberculous infection originating primarily in the thoracic glands. Both lungs presented masses of caseating tubercle, and the liver, spleen, and kidneys were all similarly affected. A mass of soft caseating glands was present in the root of the mesentery, but there was no ulceration of the intestines. Peyer's patches were unaffected. Cultures made from the bile and spleen proved sterile

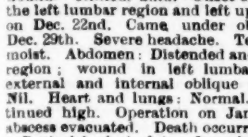
CASE 29 (Fig. and Chart 29).—*Retro-peritoneal abscess from gunshot wound.—Clinical data.*—Onset on Dec. 2nd, 1916. Gunshot wounds in the left lumbar region and left upper arm. Admitted to base hospital on Dec. 22nd. Came under observation as "suspect enteric" on Dec. 29th. Severe headache. Temperature 103·4° F. Tongue: Furred, moist. Abdomen: Distended and somewhat tympanitic in left lumbar region; wound in left lumbar region burrowing down between external and internal oblique muscles. Spleen: Palpable. Spots: Nil. Heart and lungs: Normal. Temperature of a septic type continued high. Operation on Jan. 14th, 1917. Large retro-peritoneal abscess evacuated. Death occurred on Jan. 17th.

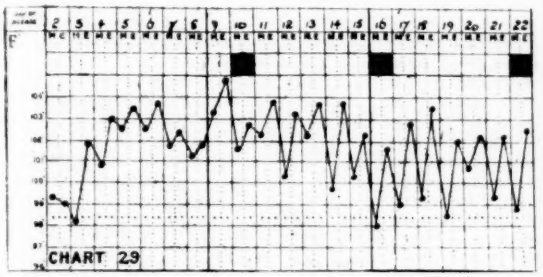
Bacteriological data.—Inoculation history: T.A.B. 2, June, 1916. Examination of fæces (3): Negative for enteric group organisms. Examination of urine (3): Negative for enteric group organisms.

Day of disease		T.	A.	B.	
	10	8·5	7·5	11	Agglutinin units.
	16	8·5	7·5	11	
	22	8·5	7·5	11	

The three examinations in this case gave identical readings for the three organisms.

Autopsy.—A large abscess cavity was found situated deeply in the muscles of the anterior abdominal wall and communicating with a second cavity in front of the sacrum. The peritoneal cavity was not involved. Nearly all the organs examined were anæmic, and many showed marked fatty degeneration. There was no evidence of enteric fever. The intestines were normal, and cultures from the bile and spleen proved negative.





CASE 30.—"*Trench fever.*"—*Clinical data.*—Onset on June 28th, 1917, with severe headache, giddiness, and shivering. Came under observation on July 12th. Temperature 101° F. Pulse 70, not dicrotic. Tongue: Slightly furred. Abdomen: Not tumid. Spleen: Not palpable. Spots: Nil. With each rise of temperature definite leg pains were evident. Felt quite well between the rises of temperature. Convalescence uneventful.

Bacteriological data.—Inoculation history: T.A.B. 2, January, 1916. Examination of fæces (3): Negative for enteric group organisms. Examination of urine (3): Negative for enteric group organisms.

Day of disease		T.	A.	B.	
	16	21·2	42·5	42·0	Agglutinin units.
	20	19·8	42·5	38·9	
	32	21·2	42·5	38·9	

The agglutinin titre for the three organisms shows no appreciable variation.

CASE 31.—*Bacillary dysentery* (Shiga).—*Clinical data.*—Onset on August 7th, 1917, with diarrhœa, which was severe. Blood appeared in the motions two days later. No vomiting or nausea and no headache. Came under observation on August 18th. Dysenteric symptoms still pronounced. Much blood and mucus in the motions. Temperature 100° F. Pulse 80, regular, good tension. Tongue: Thickly coated with white fur. Abdomen: Distended, tumid, no reflexes. Spleen: Palpable but not tender. Spots: Nil. Condition became more acute and the patient wasted rapidly. Death occurred on Sept. 2nd.

Bacteriological data.—Inoculation history: T.A.B. 2, 1916. Examination of fæces (2): Negative for enteric group organisms. Examination of urine (2): Negative for enteric group organisms. Examination of fæces for dysentery organisms: Bacillus "Shiga" isolated. Protozoological examination of the fæces negative.

Day of disease		T.	A.	B.	
	14	34	77·5	42	Agglutinin units.
	20	34	77·5	33	
	24	34	80·0	50	

The agglutinins for *B. typhosus* and *B. paratyphosus A* are steady. The *B. paratyphosus B* agglutinins show a variation which is in no way diagnostic, and which is probably due to a technical error.

Autopsy.—The body was much wasted. On opening the abdomen the great omentum was found adherent to the large gut in the left iliac fossa. The transverse colon and the stomach were in consequence dragged upon and were found occupying a position in the cavity lower than normal. Except for some general congestion in the lower six inches of the ileum the small intestine was found to be normal. There was no ulceration, nor were the Peyer's patches in any way affected. The large gut was extensively diseased and its wall tore readily. From the cæcum to the rectum the mucous membrane was found soft, swollen, and congested. In some places it was considerably hypertrophied and presented evidence of recent hæmorrhage. Scattered through the length of the gut, but most noticeable near the cæcum and in the descending colon, were many small circular ulcers. They varied in size, but the majority were about half an inch in diameter. Their edges were formed by the thickened and congested mucous membrane and the floor of many was very thin. Spleen: Not enlarged, substance firm. Cultures from the spleen and bile were negative for enteric group organisms.

CASE 32.—*Spirochætosis icterohæmorrhagica.—Clinical data.*—Onset sudden on July 24th, 1917, with vomiting and diarrhœa. Severe pains in the bones of the legs. Became jaundiced four days later and had some abdominal pain. Came under observation on August 7th. Was then intensely jaundiced; had some large patches of herpes on the upper lip and on the right ear. Temperature normal, but rose next day to 102° F. Tongue: Thickly furred and tremulous. Abdomen: Flabby; tender. Spleen: Not palpable or tender. Spots: Nil. Pulse: Regular, not dicrotic. Convalescence uneventful.

Bacteriological data.—Inoculation history: T.A.B. 2, 1916. Examination of fæces (4): Negative for enteric group organisms. Examination of urine (4): Negative for enteric group organisms.

Day of disease		T.	A.	B.	
	16	88	>1	>1	Agglutinin units.
	20	88	>1	>1	
	26	100	>1	>1	
	32	89	>1	>1	

The typhoid agglutinin titre remained steady on four examinations. No agglutinins were evident for paratyphoid A or B. Examination of the urine during the third week of the disease demonstrated, on several occasions, the presence of large numbers of spirochætes morphologically identical with the *Spirochæta icterohæmorrhagia*.

SPECIFICITY OF THE AGGLUTINATION TEST AS SHOWN BY THE USE OF STANDARDISED AGGLUTINABLE CULTURES.

The specificity of agglutinin production has been questioned by many observers who have found that in the non-inoculated, agglutinins have become evident for one or other of the enteric organisms in the course of pyrexias having no connexion with an enteric infection; and that in addition a marked alteration in titre in inoculated subjects has occurred in the same type of case.

It has been asserted that these varied infections were capable of producing this non-specific response, and that the fallacies attendant on it nullified the value of the test. It is admitted that the haphazard preparation of emulsions of the enteric organisms used in an agglutination test will yield such results. It is not surprising that this should be so if the strain of organism is not carefully selected, and the opacity and sensitivity of the emulsion is not controlled. It was recognition of these facts that made the necessity of standardised agglutinable cultures evident.

The fact that paratyphoid infections in patients who have received a typhoid vaccine usually causes a rise in titre of the typhoid inoculation agglutinins has been held as further evidence that the response to infection is not absolutely specific. It has been suggested that in addition to producing its homologous agglutinins, a paratyphoid A or paratyphoid B infection is also capable of elaborating agglutinins for *B. typhosus*. Experience of these infections in the non-inoculated has disproved this view. The agglutinins produced have been strictly specific, and there has been no appearance of agglutinins other than those corresponding to the infecting organism. The rise in titre of the typhoid inoculation agglutinins has not been a non-specific production, but a stimulation of the mechanism which has already been established by the typhoid inoculation. It is quite conceivable that infection with a closely allied organism will cause such re-stimulation.

Tables III. and IV. show that this co-agglutination with members of the enteric group of organisms is not likely to give rise to difficulties provided standardised agglutinable cultures are employed. When an organism has been isolated the fact is noted. The figures given under the infecting organism represent the highest dilution of the serum at which standard agglutination was evident. The figures given in the case of the non-infecting organisms represent the lowest dilution employed and at which no agglutination occurred. The possibility of inhibition zone phenomena was excluded by putting the serum up in higher dilutions with negative result. The examples given represent only a small proportion of those available.

The series of cases quoted in Tables III. and IV. make it evident that in the non-inoculated the response to infection is absolutely specific, and there is no possibility of difficulties arising from so-called group agglutination. Dreyer's statement[4] that a serum may "agglutinate *B typhosus* 1 in 500, 1 in 10,000, or even 1 in 200,000, and it will not agglutinate paratyphoid A or B as much as 1 in 10" can be fully confirmed. It must be emphasised that during the whole course of the disease there was no production of agglutinins other than for the organism responsible for the infection.

In both series it is evident that a paratyphoid A or paratyphoid B infection is capable of producing only its homologous agglutinins. If agglutinins for both these organisms become evident and exhibit the usual rise and fall, the only justifiable conclusion is that the patient is suffering from a dual infection. This point appears to have given rise to some difficulty in diagnosis in a series of cases

TABLE III.—*Non-inoculated Series.*

Typhoid.

Organism isolated.	Standard agglutination (dilutions).		
	B. typh.	*B.para. A.*	*B.para. B.*
B. typh.			
In fæces.	12,000	0 in 25	0 in 25
,, blood.	1,000	0 ,, 25	0 ,, 25
,, ,,	500	0 ,, 25	0 ,, 25
,, fæces.	320	0 ,, 25	0 ,, 25
,, ,,	640	0 ,, 25	0 ,, 25
,, blood & bile, PM.	250	0 ,, 25	0 ,, 25
In blood.	1,000	0 ,, 25	0 ,, 25
,, ,,	250	0 ,, 25	0 ,, 25
,, ,,	290	0 ,, 25	0 ,, 25
,, fæces.	1,375	0 ,, 5	0 ,, 12·5
,, blood.	3,200	0 ,, 12·5	0 ,, 12·5

Paratyphoid A.

B. para.A			
In blood.	0 in 12·5	70	0 in 12·5
None.	0 ,, 5	20	0 ,, 5
In fæces & blood.	0 ,, 25	500	0 ,, 50

Paratyphoid B.

B. para.B			
In fæces.	0 in 25	0 in 5	5,000
,, ,,	0 ,, 25	0 ,, 25	250
,, ,,	0 ,, 25	0 ,, 25	1,000
,, ,,	0 ,, 25	0 ,, 5	2,500
,, ,,	0 ,, 25	0 ,, 5	1,000
In urine.	0 ,, 25	0 ,, 5	1,000
,, fæces.	0 ,, 25	0 ,, 5	10,000
,, ,,	0 ,, 25	0 ,, 25	10,500
,, ,,	0 ,, 5	0 ,, 5	100,000

TABLE IV.—*Typhoid Inoculated Cases.*

Typhoid.

Organism isolated.	Standard agglutination (dilutions).		
	B. typh.	*B.para. A.*	*B.para. B.*
B. typh.			
In blood & fæces.	180,000	0 in 12·5	0 in 12·5
In fæces.	70,000	0 ,, 5	0 ,, 5
,, blood.	10,000	0 ,, 25	0 ,, 25
,, fæces.	1,000	0 ,, 12·5	0 ,, 12·5
,, fæces & urine.	8,000	0 ,, 5	0 ,, 5
In urine	1,000	0 ,, 5	0 ,, 5
,, blood & fæces.	1,500	0 ,, 25	0 ,, 25
In fæces	640	0 ,, 5	0 ,, 12·5

Paratyphoid A.

B. para.A			
In blood.	1,000	5,000	0 in 25
,, fæces.	1,000	2,500	0 ,, 25
,, blood.	250	1,000	0 ,, 25
,, ,,	250	350	0 ,, 25
,, ,,	250	500	0 ,, 25
,, fæces.	15	1,200	0 ,, 2·5
,, blood.	25	350	0 ,, 5
,, ,,	100	1,000	0 ,, 25

Paratyphoid B.

B. para.B			
In fæces.	1,250	0 in 5	100,000
,, ,,	15,000	0 ,, 5	50,000
,, ,,	11,000	0 ,, 2·5	12,500
,, ,,	880	0 ,, 5	12,500
,, ,,	1,500	0 ,, 2·5	17,600
,, ,,	50	0 ,, 5	10,000
,, ,,	1,000	0 ,, 5	5,700
,, ,,	1,000	0 ,, 5	2,500
,, ,,	140	0 ,, 5	1,130
,, ,,	680	0 ,, 5	4,520

from Gallipoli quoted by C. J. Martin and Upjohn.[5] These cases were probably mixed paratyphoid A and paratyphoid B infections. The fact that bacteriological examination was successful in isolating one of these organisms only does not in any way negative this probability.

LIMITATIONS OF THE AGGLUTINATION TEST.

It is evident that an enteric infection occurring within a few days of inoculation is exceedingly difficult, and often impossible, to diagnose by means of agglutination tests. The rise in inoculation agglutinins will be coincident with that of the agglutinins developed by the infection, and it is impossible to say how far the rise in titre is due to inoculation or to the disease. Opinions expressed as a result of examinations in such cases must often be fallacious. On the other hand, the test should in all cases be applied, as the rise and fall in titre of one organism may be so markedly accentuated as to make it evident which member of the group is responsible for the infection. Fig. 33 illustrates this point.

In the series of cases already cited as being considered proved by agglutination the marked rise in titre of the infecting organism is very evident, and the fluctuations in titre of the non-infecting organisms so slight as to leave the precise diagnosis little in doubt. It would be ideal if such results could always be arrived at. Often, however, it happens that a rise and fall in titre of two or of all three organisms occurs synchronously and to the same extent. In these cases, whilst it is evident that the infection is due to one member of the group, it is always difficult, and often impossible, to say precisely which organism is responsible. Under such circumstances the diagnosis of "enteric group" appears to be the only one justifiable unless the causal organism has been isolated.

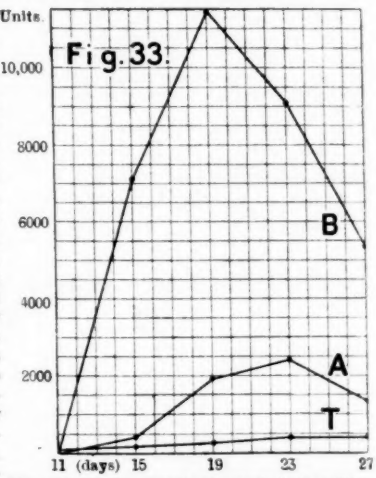
CONCLUSIONS.

A large experience of the agglutination test in enteric fevers has made it evident that the method must be accorded a very prominent position in the laboratory diagnosis of this group of diseases. This is more especially the case since the introduction of preventive inoculation with the triple vaccine, as the isolation of the infecting organism from the blood, fæces, and urine has become more difficult. The complexity in diagnosis caused by the presence of inoculation agglutinins has been simplified by the standardisation of the test as illustrated in the technique devised by Dreyer. An attempt at making a diagnosis on agglutination results by any method other than a repeated and accurate titration of the agglutinin content of the serum does not appear feasible, and the use of standardised agglutinable cultures in this connexion is obvious.

Regarding the value of the test in all cases, the opinion which has been formed may be summarised as follows:—

1. *Positive results.*—Presuming that the technique is carried out by a skilled and careful worker, a change in titre of 100 or 200 per cent., manifesting itself in a regular curve and reaching its maximum between the sixteenth to the twenty-fourth day (in exceptional cases as late as the thirtieth day) justifies a diagnosis of active enteric infection.

In many cases it is possible to determine exactly which organism is responsible for the infection, because the rise in titre for one organism is so markedly accentuated. Cases of enteric infection are, however, met with in which a rise or fall in titre for all three organisms occurs synchronously and equally; in such cases it is impossible to identify with certainty the member of the group causing the infection.



The agglutination graph represented above illustrates a paratyphoid B infection coincident with inoculation. The patient was feeling ill the day before he received 1 c.cm. of T.A.B. vaccine. The case ran a typical course and *B. paratyphosus B* was repeatedly isolated from the fæces. The marked accentuation in rise of the paratyphoid B agglutinins is evident, the maximum being reached about the nineteenth day.

2. *Negative results.*—Cases which are clinically classified as belonging to the enteric group at present occur in which not only do repeated bacteriological examinations fail to isolate an organism, but in which agglutination readings are so absolutely level or exhibit such slight variation that they afford no help in confirming the clinical diagnosis. Presuming that such are true cases of enteric infection, the failure to confirm the clinical opinion by agglutination findings may be due to one of the following causes:—

(*a*) Possibly, but not necessarily as a result of inoculation, the character of the infection may be so mild that agglutinins are produced to such slight extent as to cause a variation in titre which is not diagnostic. As an illustration of this point the following case of a mild typhoid infection in a non-inoculated subject may be quoted.

The case came under observation on the fourteenth day of the disease, an agglutination test made on the same day showing standard agglutination for *B. typhosus* in a dilution of 12·5 (2 units) only. No agglutinins were evident for *B. paratyphosus A* or *B.* The test was repeated on the twenty-first day of the disease and gave identical results. During this period *B. typhosus* was repeatedly isolated from the fæces. A mild relapse occurred on the thirtieth day, and a third agglutination test made two days later showed standard agglutination for *B. typhosus* in a dilution of 1 in 295.

The case is an example of how slight the immunity response may be in a mild infection.

(*b*) The organism responsible for the infection may be a feeble producer of agglutinins. This particularly applies to paratyphoid A infections. It is now well known that in a non-inoculated or typhoid-inoculated subject a diagnosis of paratyphoid A fever is justifiable when an agglutination for this organism is evident in a dilution as low as 1 in 10. The organism has been repeatedly isolated in this laboratory in cases which have never given higher readings. The production of so feeble an agglutinin response makes it evident that in triple inoculated subjects the change in titre of inoculation agglutinins for *B. paratyphosus A* must, in a certain proportion of cases, be so slight as to render diagnosis uncertain or impossible.

(*c*) The fact that many of these cases have, in addition to receiving a typhoid vaccine, also been inoculated with four doses of T.A.B. vaccine, may in some way influence agglutinin production.

It is not yet clear how far one can stimulate agglutinin formation without exhausting the mechanism of production. It has been noticed that in typhoid-inoculated subjects infected with *B. paratyphosus B* there is most usually a marked stimulation of the typhoid-inoculation agglutinins. It would appear from experience of these infections in triple inoculated subjects who had at some previous period also received a typhoid vaccine that their response is much more often slighter in extent or entirely absent.

Experience of the test in diseases other than enteric has confirmed that of Ainley Walker,[6] who states: "The rises in enteric agglutinin titre in association with other febrile conditions very rarely amount to as much as 100 per cent., and are much more frequently either altogether absent or so small as to be practically negligible." Conradi[7] has stated that he has demonstrated changes in titre which would be considered diagnostic in miliary tuberculosis, dysentery, pneumonia, erysipelas, and Weil's disease. It is not clear what method he adopted in carrying out his investigations, but the examination in this laboratory by Dreyer's method of many cases of similar disease has failed to show any appreciable variation of agglutinins in triple inoculated subjects.

Earlier experience of standard agglutinable cultures in non-inoculated and typhoid-inoculated subjects has confirmed the experience of Glynn and Lowe[8] "that co-agglutination between paratyphoid A and B, or vice versa, did not occur with the Oxford emulsions." Their opinion was based on a series of cases examined during convalescence. Examinations carried out during the active stage of the disease have made it clear that co-agglutination is not a factor which should cause difficulty in diagnosis.

I have to express my indebtedness to Lieutenant-Colonel C. R. Evans, D.S.O., R.A.M.C., who has kindly placed at my disposal the records of the cases referred to in this communication.

Note by Colonel Sir WILLIAM LEISHMAN.

Doubts have from time to time been expressed as to the diagnostic value of agglutination tests in fevers of the typhoid group contracted in men who had been inoculated with "T.A.B." vaccine. These doubts have frequently had special reference to the employment of Professor Dreyer's agglutination technique and of his standard emulsions, and to the validity of conclusions based on the behaviour of the agglutinin curves obtained with them. As this method is that which has been almost exclusively used in the B.E.F. in France, it has been suggested that our views as to its value ought to be put on record. To this end I accordingly asked Captain Perry, whose experience of this method is exceptionally wide, to undertake the above description of a series of his cases, which, it is hoped, will serve to demonstrate what we believe to be its great value. This opinion, I have reason to know, is shared by almost all the pathologists in France who have had occasion to employ it on a sufficiently large scale. Professor Dreyer may perhaps be a little too optimistic as to its simplicity and as to the facility of the interpretation of the agglutinin curves, but there can, I think, be no question but that a series of tests carried out during the attack, by experienced hands, is capable of giving clear indications as to the particular germ concerned in the infection in a large majority of the cases from which a bacillus cannot be isolated.

Captain Perry's article gives, as will be seen, only a series of illustrative cases, but these have been selected in such a way that they appear to cover most of the points which have been raised.

Careful records have been kept of the agglutination readings in the enormous majority of the cases of typhoid and paratyphoid fevers which have occurred during the operations in France, fortunately a very moderate number, which it is hoped may eventually be analysed. At present this is not possible, but it would be ungrateful to delay longer our acknowledgment of the debt we owe to Professor Dreyer's method, and also to the Medical Research Committee for the organisation and the regular supply to us of the standard emulsions and the necessary agglutination outfits.

References.—1. Ainley Walker: THE LANCET, Nov. 25th, 1916. 2. Directions for the Use of Standard Agglutinable Cultures, Department of Pathology, University of Oxford, on behalf of the Medical Research Committee. 3. Dreyer, G., and Inman, A. C.: THE LANCET, March 10th, 1917. 4. Dreyer, G.: Proc. Roy. Soc. Med., 1915, vol. ix., Med. Sec., p. 9. 5. Martin, C. J., and Upjohn: Brit. Med. Jour., Sept. 2nd, 1916. 6. Ainley Walker: THE LANCET, Nov. 25th, 1916. 7. Conradi and Bieling: Deutsche med. Woch., Oct. 19th, 1916. 8. Glynn and Cronin Lowe: Journal of the R.A.M.C., December, 1916; THE LANCET, 1916, ii., 222.

SEPTIC PHLEBITIS DUE TO GUNSHOT WOUNDS.

BY H. BURROWS, M.B., B.S. LOND., F.R.C.S. ENG.,
CAPTAIN, R.A.M.C. (T.F.).

OFTEN to-day, in the treatment of gunshot wounds, we are confronted with a pyrexia for which no obvious cause can be found. In such a case it is well to consider the possibility of the presence of septic phlebitis.

In connexion with the frequency of septic phlebitis consequent upon gunshot wounds one cannot help being struck by the large percentage of cases in which evidence of broncho-pneumonia or pleurisy is found post mortem. Thus, K. Taylor[1] found pulmonary lesions in 42 out of 51 consecutive autopsies performed on men who had died from gunshot wounds.

To amplify the evidence obtainable from the post-mortem room I applied to Lieutenant T. H. G. Shore, R.A.M.C., who is in charge of the district mortuary, and he kindly undertook to look through the reports of the last hundred autopsies carried out in his department.

The results of Lieutenant Shore's inquiry showed that among 100 consecutive cases were 25 in which death had followed gunshot wounds of the limbs.

Location of wound.	No. of cases.	Phlebitis.	Broncho-pneumonia or infarcts.
Arm	3	0	2 (66·6%)
Leg	24	10 (41·6%)	9 (37·5%)

In two cases there were wounds of both arm and leg.

Pulmonary infarcts were found in four of the cases in which phlebitis was not observed, although the presence of the infarcts indicates that it was present.

The table bears out the main theme of this paper, that septic infection of veins is, so far as the base hospitals in France are concerned, the chief cause of mortality after gunshot wounds of the extremities.

Clinical Signs.

The signs of septic phlebitis are not always so manifest as to be easily observed during life. They have to be sought with care, and even so may prove elusive and indefinite.

Of course, a red and tender track along the course of a superficial vein may lead to a ready diagnosis. But such an obvious indication is often lacking, although septic phlebitis is present; while in the case of a deeper vein there may be no visible or tangible evidence at all of thrombosis. Emphasis is needed on this point. A septic thrombus may be present in the common femoral vein, for example, without pain, tenderness on pressure, or any other local manifestation whatever. Even recognisable œdema, local or distal, may be absent.

Diagnosis.

First of all is required a knowledge that the process does occur, and that local examination yet may fail to give a clue to its presence. Beyond this, weak though it sounds, we must rely upon surgical instinct to guide us aright.

A continued pyrexia for which we cannot otherwise account, especially if accompanied by rigors, always should lead us to suspect that septic phlebitis may be present. The development of broncho-pneumonia or pleurisy also should guide us into the same train of thought, and is occasionally the surest clinical evidence we can get; though by this time we shall have allowed the patient's jeopardy to get some way ahead of us.

In some cases there is a general diffuse œdema which is suggestive of phlebitis of a larger, deeply-seated vein. An amputation has been performed, the wound appears to be satisfactory, no local abscess can be detected, and yet the patient does not convalesce; pyrexia continues, and he seems to be going downhill. By comparison with the same part of the sound limb we find that the amputation stump is swollen. There may or may not be pitting of the skin on pressure; this is not so important, but the swelling is there, and strongly suggests the presence of deep-seated phlebitis.

A similar clinical picture, it is true, will be shown occasionally by an abscess which is tracking along the deep fascial planes, but inasmuch as both conditions require investigation by the knife no great evil will come to pass if before operation we find ourselves unable to say which of the two conditions exists. Nor if we happen to find an abscess need we neglect to consider the state of the veins in its immediate neighbourhood.

Treatment.

The proper treatment consists in tying the vein at some point above the level of the clot, dividing it below the ligature, and either removing a length of the vein with its infected contents or, if this be not possible, opening the vein freely to afford drainage.

No doubt in some cases it would be sufficient to dispense with the proximal ligature, merely opening and draining the vein lower down in the limb. But as we have no means of determining beforehand in any

[1] Annals of Surgery, November, 1915.

particular case whether the progression of sepsis has or has not outrun the accompanying thrombosis, and as we are desirous to avoid detachment, even of uninfected clot, it will be safer whenever possible to occlude the vein above the lesion at an early stage of the operation, and so prevent the carriage of septic emboli to the lungs.

This, however, is not always feasible, as the clot already may have extended too far by the time the condition is recognised, and ligation of the proximal half of the subclavian vein or of the iliac veins, for example, is accompanied by practical perils which probably outweigh the hypothetical advantages. In such cases it will be the wiser course to open the affected vein at as high a level as can be reached without great risk, and to rely on drainage to prevent further spread of the infective process in a proximal direction.

In one case in which the clot had spread into the external iliac vein, and in which a transperitoneal operation was performed in order to ligate the common iliac vein above the level of the clot, the patient died of acute peritonitis. Examination of the clot in the external iliac vein in this case showed the presence of streptococci. In this case the vein was divided between two ligatures, and the peritoneal infection probably originated from the interior of the vein.

A useful point to remember when proceeding to tie a septic vein is that there are certain points in the course of a vein where clotting is apt to be checked for a while.

These are the levels at which large tributaries enter the vein. Thus, in an infection of the superficial femoral vein thrombosis is apt to be checked for a while at the places of entry of the profunda vein, and the internal saphena vein, while higher up the confluence of the internal and external iliac veins is another halting place, and still further up the union of the two common iliac veins is another obstacle to the extension of clotting.

Another anatomical fact which sometimes may afford useful suggestion is that the main channel by which blood returns from the leg is the superficial femoral vein, while the profunda vein is the main return channel for the thigh. This may help us to make a correct guess as to the seat of thrombosis, and will, in some cases at any rate, put us on the right track at the commencement of an operative search.

In the event of a thrombosed vein being discovered at an operation we may think fit to dissect out and remove as much of the diseased structure as is readily accessible. In doing this, it would be an error to apply a ligature to the distal portion, for if we cannot remove the whole of the infected vein we must not prevent drainage of the portion that is left. Therefore the distal part of the vein should be left open, and in some cases its drainage may be facilitated by bringing it up to the surface and fixing it to the edge of the skin wound.

A cardinal rule in the treatment of any wound is to immobilise the injured part. This rule clearly has an added force when septic phlebitis is present, for in these circumstances any movement may assist in causing the detachment of clot with consequent infection of the lungs. Especially is care required during the manipulations necessary in transporting the subject to the operation table and during the operation itself. With regard to the latter it is a good plan, as soon as the upper limit of the clot has been defined, to tie the vein above this level before any further step is undertaken.

Cases.

Space permits only of the following cases noted. The great importance of septic phlebitis was not suspected until detailed observation at the mortuary brought the matter to light. Since then we have to some extent succeeded not only in recognising the condition in cases in which it probably would have been overlooked a little while ago, but in adopting remedial measures before the patient's deterioration has gone too far. We believe that the mortality of gunshot wounds can be considerably reduced by the earlier recognition of septic phlebitis and its appropriate treatment.

CASE 6. (Under care of Major H. A. Moffat).—Wounded in right heel on 15/11/17. Explored at C.C.S.; no foreign body found. On arrival at base on 17th wound septic; foot inflamed and swollen. Operation; additional drainage provided. 30th: Has had high pyrexia; to-day complaint of pain in right axilla, where pleural friction can be heard. Induration along course of internal saphena vein.

Operation.—Pus found in saphena vein in calf of leg. Just above knee saphena vein was thrombosed, five inches higher up it was not thrombosed, and it was ligated and divided at this point. 2/12/17: Rib resection for drainage of right streptococcal empyema. 3/1/18: Steady, uncomplicated recovery.

CASE 7.—Multiple wounds, received 14/12/17. Left thigh amputated at C.C.S. on the 14th. 21st: Continued pyrexia without rigors. 31st: Internal saphenous vein felt to be thrombosed.

Operation.—Exposure and removal of 5 inches of internal saphenous vein which is thrombosed up to where it enters common femoral vein. Abscess in left loin opened and drained. After-history: Uninterrupted recovery.

CASE 8. (Under care of Major H. A. Moffat).—Multiple bomb wounds, received 4/1/18. One of less severe wounds is a gutter wound in region of left elbow, not involving bones or joint. 9th: Some tracking of pus in left forearm and arm from elbow wound, with pyrexia. Anæsthetic. Cephalic vein found to be thrombosed. Vein ligated above upper limit of clot, and a length of thrombosed vein excised and sent to pathologist, who reported presence of streptococci in intravenous clot. 11th: Pyrexia continues. Forearm swollen. Anæsthetic given. Lower part of cephalic vein found to contain pus for some distance down forearm; below level of pus vein thrombosed as far as wrist; entire vein dissected out. 21st: Abscess in right foot opened and drained. After-history: Uneventful recovery.

Conclusions.

The following propositions may be advanced: 1. That septic phlebitis is a common complication of gunshot wounds. 2. That spontaneous recovery may take place, especially if small veins alone are involved. 3. That septic phlebitis is often difficult to recognise during life. 4. That if its presence be overlooked, fatal complications are likely to ensue. 5. That timely surgical interference is attended with a good measure of success.

Finally, I should like to thank the medical officers under whose care the patients have been for permitting me to make use of their cases. I am especially indebted to Lieutenant Shore for the trouble taken in post-mortem examinations, and for analysing the results and permitting me to publish the statistical table.

CEREBRO-SPINAL FEVER:

NOTES ON 92 CONSECUTIVE CASES.

BY W. H. W. ATTLEE, M.A., M.D. CANTAB.,

CAPTAIN, R.A.M.C. (T.C.).

THE patients whose notes are here briefly summarised have all come from one area in the field, were all soldiers between 19 and 48 years of age, and only two have come from any one unit. These two, although in the same battalion, were in different companies, and had not been in contact so far as they knew. The incidence of the illnesses is shown in the accompanying chart.

All were nursed under canvas and were kept until fit to bear a train journey to the base. The average day of the disease when admitted was the fourth. All were treated with Lister or Pasteur serum, given intrathecally only, except in one instance in which it was given intravenously as well; this patient died. Lister serum was given at first and when its supply ran short Pasteur serum was substituted, the remaining Lister being hoarded for the milder cases, those in which the patient seemed to have a reasonable chance. This was done because the Pasteur serum would not agglutinate any of the strains of meningococci met with, and for this reason the comparison of results is perhaps a little unfair to the Pasteur serum.

In all the cases but six the meningococcus was seen in the cerebro-spinal fluid and in most cases cultivated. In these six the cerebro-spinal fluid was turbid and contained many polymorphonuclear leucocytes, and one of the patients died with the usual post-mortem appearances in the meninges of cerebro-spinal fever. Three of the six were in the Lister series and three in the Pasteur.

Thirty-three cases were treated with Lister serum. Of this number 18 recovered and 15 died. Of the recoveries two were completely deaf when evacuated and one was completely deaf in one ear. In none of the others was there any sign of permanent disability. One of the deaths was from streptococcal septicæmia, on the fifth day, when the meningeal symptoms were no longer marked, set up apparently by an intravenous saline administered before admission.

Fifty-two cases were treated with Pasteur serum. Of this number 33 recovered and 19 died. None who recovered had any sign of permanent disability. Among the deaths was one who lived for 65 days, long after all meningeal symptoms and signs had disappeared, and developed general anasarca with albuminuria, and was found post mortem to have large white kidneys. Two others died after meningeal symptoms had disappeared, of cystitis and pyelitis, set up, no doubt, by the catheterisation which had been repeatedly necessary in the early days of the illness. There was nothing macroscopically abnormal in the brains of these three.

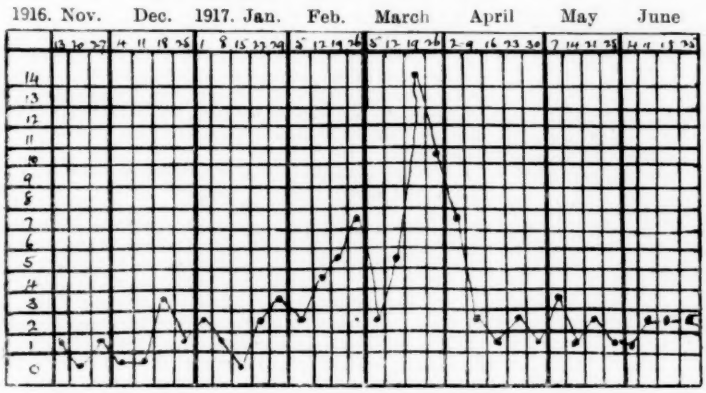
Seven cases were treated with Lister and Pasteur serums combined. Of this number 3 recovered and 4 died. Of these patients, 4 began with Lister and were given Pasteur afterwards, rather as a forlorn hope, and all died; the other 3 began with Pasteur and afterwards had Lister owing to a temporary shortage of supply, and all recovered.

Symptoms and Signs.

Of the 54 who recovered, 21 were unconscious or delirious on admission and 33 sensible. Of the 38 who died, 23 were unconscious or delirious and 15 sensible. In every case the neck was definitely stiff, and in every patient who was not comatose or moribund on admission Kernig's sign was present at some time or other in the course of the illness. Twelve had rashes, 6 of these recovering and 6 dying. Twenty-two had one or more cranial nerves affected, strabismus being definitely noted in 16. Nystagmus has been quite common.

Serum arthritis has been common, most often of the wrists and knees, once of the temporo-maxillary joints. It has never needed any active surgical treatment. Urticarial and erythematous rashes have been frequently noted. Two had orchitis during convalescence. One had cyclitis beginning some time before admission on the fifth day of disease.

Only one symptom has been at all constant—headache, generally acute and of sudden onset. Only one sign has been of real help to us in diagnosis—stiffness of the neck. In testing for this sign it has been found of little use to raise the man's head with the hand or to ask him to bend his head forward when lying on the back. A man who is feverish and feeling ill will often not make the effort. It has been found more reliable to put him on his side or to sit him up, and then to make him attempt to put his chin on his chest. If in this position the neck can be fully flexed without difficulty or pain, we have thought we could exclude cerebro-spinal meningitis for all practical purposes. The test is almost as quick and as easy as looking at a tongue, and if it were made a routine practice in every case of headache of unknown origin we believe there would be less delay in the diagnosis of many cases.



Kernig's sign has been of help, though not to the same extent. There is so much room for a difference of opinion when the sign is neither markedly positive nor markedly negative.

Temperature and pulse seem to vary from hour to hour and have been found valueless as signs, rashes have been infrequent, and alterations in knee-jerks, abdominal and plantar reflexes have not helped us at all.

Pharyngeal swabbing has not been used as a diagnostic measure As a practical working rule we have come to the conclusion that a man who is ill, complaining of acute headache of sudden origin, without any definite physical signs other than some neck stiffness, should be suspected of having cerebro-spinal fever, and should be punctured without delay.

Technique of Lumbar Puncture.

Chloroform has invariably been given for serum administration, though often no local or general anæsthetic has been given for a diagnostic puncture. The patient has been put on his side and propped up, usually to an angle of 45°, and as much fluid as possible drawn off. A dry tap has meant without exception that the lumen has not been reached. During the period dealt with no case of cerebro-spinal fever has been met with in which the fluid was quite clear at the first puncture. Some turbidity was always visible to the naked eye.

It has been the rule to give serum by the gravity method every 24 hours for the first few days, though in a few bad cases it has been given every 12 hours. We have found much difficulty in deciding when to omit the daily puncture. Sometimes the first omission has been regretted, a recrudescence having followed. Sometimes, on the other hand, a patient punctured daily makes little headway until the treatment is stopped, and then at once begins to improve. We have taken as indications for less frequent puncture diminution of neck stiffness, improvement of the mental condition, absence of headache, a cleaning tongue, cessation of fever, and a clearing fluid, and as calling for more serum increasing head retraction, mental stupor or delirium, headache, coarse tremors of the head and hands, and increasing turbidity of the fluid. It has not been a rule to continue the punctures until the fluid is clear.

The greatest number of punctures in any one of the recoveries was 26, of those who died 25. The greatest total amount of fluid drawn off among the recoveries was 1909 c.cm., among those who died 2127 c.cm. The average amount of fluid per puncture in a recovery was 61 c.cm., in those who died 54 c.cm. The average total quantity of serum given each man who recovered was 180 c.cm.

Conclusions.

1. The disease can be only slightly infectious; at any rate, in the field.
2. Early diagnosis would be more common if it were made a routine to test for neck stiffness in all acute illnesses with headache.
3. Early treatment seems to be of the utmost importance. This series of cases, in which treatment was begun on the average on the fourth day of the disease, compares very unfavourably with other series in which treatment was begun, in the majority of cases, during the first 48 hours.
4. Serum does seem to have some effect. The differences in the mortality in this series cannot be explained altogether by the possibility of there having been more mild cases in the Pasteur series than in the Lister. Since the above notes were written 5 more cases have been treated with Pasteur with 4 recoveries and 1 death.

I am indebted to Captain R. H. Urwick, R.A.M.C., for the bacteriological work, and for his willing assistance at all times in connexion with these patients.

TRENCH FEVER: OBSERVATIONS ON THE CONDITION OF THE SPLEEN AND LEUCOCYTES.

BY D. L. TATE, M.B., CH.B. GLASG.,
CAPTAIN, R.A.M.C. (T.C.);
AND
J. W. McLEOD, M.B., CH.B. GLASG.,
CAPTAIN, R.A.M.C. (T.C.).

IT would be quite a fair summary of the British writing which has appeared till now on the subjects referred to in the title of this paper to say that "trench fever" is a disease which is not associated with splenic enlargement, but which is characterised by a moderate mononuclear leucocytosis. It is the object of this paper to challenge both of those statements.

Splenic Enlargement in Trench Fever.

In the first clinical description of the disease which was published—that of Hunt and Rankin[1]—it is definitely stated that splenic enlargement does not occur, and in the most extensive record of work on the subject which has yet been published—that of McNee, Renshaw, and Brunt[2]—there is no mention of the spleen.

Most of the other writers who have published on this subject have come into line with the foregoing. Hurst,[3] however, is an exception. He described a definite splenic enlargement which occurred in the cases of this disease which he had observed in the Eastern Mediterranean, but he concludes that these findings might be peculiar to that theatre of war.

It has, however, been our experience while working over an area of 20 to 30 miles on the Western front, between the autumn of 1915 and that of 1916, that enlargement of the spleen in "trench fever" is sufficiently common to warrant its mention amongst the clinical features of the disease.

Amongst 214 cases of short pyrexia carefully observed during this period and considered, on clinical grounds, to be examples of trench fever, 37 had a palpable spleen at some stage of their illness—i.e., 17 per cent. had palpable spleens; hence some degree of splenic enlargement was probably a feature of most, if not of all, the cases.

It has been urged in criticism of some of these findings that the cases were paratyphoid infections modified because of T.A.B.

[1] Hunt and Rankin: THE LANCET, 1915, ii., 1133.
[2] McNee, Renshaw, and Brunt: R.A.M.C. Journal, 1916, xxvi., 490.
[3] Hurst: Ibid., 1917, xxviii., 207. THE LANCET, 1916 ii., 673.

inoculation. Against such an explanation, however, there are the following facts:—

(1) That the cases were clinically distinct from cases of paratyphoid fever seen at the same time, and from which paratyphoid bacilli were recovered.

(2) That these short, irregular pyrexias with splenic enlargement were noted as frequently when proved paratyphoid infections had become rare as when they were fairly numerous.

(3) That 25 of the 37 cases cited with splenic enlargement were examined for bacilli of the typhoid group, and that the results were invariably negative.

Condition of the Leucocytes in Trench Fever.

The earliest descriptions of "trench" fever make it a disease characterised by a rather variable leucocytosis, with a maximum of about 25,000 and a moderate relative increase of the mononuclear cells. The only opposite conclusion expressed by a British worker which we have noticed is that of Coombs,[4] who speaks of a slight polymorphonuclear leucocytosis, but as he only describes one case the observation has not much weight.

Our own observations with regard to the degree of leucocytosis, its variations, and the relative proportions of the different cells do not differ to any appreciable extent from those recorded previously, but we believe that an error has been made in interpreting the findings obtained as evidence of the existence of a slight relative lymphocytosis in "trench fever."

In two respects the observations published are insufficiently controlled: first, they do not record a comparison between the differential counts of a patient's blood in his pyrexial and convalescent periods; secondly, they do not record any observations of the average differential leucocyte count of healthy men living under the conditions to which their patients had been accustomed. Our observations with regard to these points are the following:—

Total and differential leucocyte counts were made in 27 cases of "trench fever": some were observed during the pyrexial periods, some in the intervals between periods of fever, and some on both occasions. The average* (1) of 24 counts during pyrexia and (2) of 11 counts during apyrexial periods was:—

	Total L.	P.	S.L.	L.L.	L.Hy.	E.	M.	T.
(1) Pyrexia ...	10,766	65·14	21·96	4·32	4·76	2·3	0·43	0·68
(2) Apyrexia...	10,283	54·37	35·0	3·15	4·44	2·0	0·56	0·47

The increase of polymorphonuclear leucocytes during pyrexia is rather more marked when the observations relate to the same cases. In the three cases for which counts were made, both in periods of fever and afterwards, the figures are:—

	Total L.	P.	S.L.	L.L.	L.Hy.	E.	M.	T.
Pyrexia	10,125	66·6	24·1	4·2	3·0	1·0	0·4	0·5
Apyrexia... ...	12,700	51·5	37·6	2·7	4·9	1·8	0·58	0·66

* Variations from the mean figure given were not very marked.

Normal Proportions of Polymorphonuclear Leucocytes and Lymphocytes in the Blood of Soldiers in France.

In order to strike a normal for comparisons with the above figures, groups of healthy men with no record of illness while in France were picked from various units.

In all, 33 were examined, and differential counts were done in 26. The average figures for these were:—

Total L.	P.	S.L.	L.L.	L.Hy.	E.	M.	T.
8,595	44·8	41·4	4·7	3·7	4·0	0·7	0·4

To institute a further comparison, 10 cases of nephritis were examined. It was considered that, as most of these men had distinct bronchitis, they were likely to show a moderate polymorphonuclear leucocytosis. The figures obtained were:—

Total L.	P.	S.L.	L.L.	L.Hy.	E.	M.	T.
11,640	63·87	28·15	2·0	3·32	1·85	0·47	0·25

From these observations we are inclined to believe: (1) that the usual relative proportions of leucocytes amongst soldiers in France is not the "normal" of the text-books; (2) that errors are likely to be made when differential counts made on soldiers, in case of illness, are compared with that standard; and (3) that a moderate polymorphonuclear leucocytosis is a feature of trench fever. It may be pointed out that a marked relative lymphocytosis has already been described as a feature of two quite distinct pathological conditions to which our soldiers are subject; these are convalescence from gas poisoning (Miller[5]) and irritable heart (Briscoe[6]). In neither instance does the writer mention an extensive series of control observations on normal soldiers recently returned from France, and we are probably justified in quoting their findings in support of the conclusion that a relative lymphocytosis is the rule amongst the troops in France.

[4] THE LANCET, 1917, i., 183.
[5] Miller: THE LANCET, 1917, i., 793.
[6] Briscoe: Ibid., i., 832.

INDIAN MEDICAL SERVICE.—It has been decided that officers serving in the field shall be given acting rank to the extent admissible to officers of the Royal Army Medical Corps with effect from the commencement of the war. Further orders will be issued in regard to the grant of acting rank to officers occupying field appointments.

A NOTE ON EYE-STRAIN.

BY A. S. COBBLEDICK, M.D., B.S. LOND.

Dr. Des Vœux's paper on Eye-strain in THE LANCET of March 2nd is certainly refreshing, inasmuch as it does not come from one who has a "bee in his bonnet," as the ophthalmic surgeon who carefully corrects astigmatism is frequently dubbed. I take it that all these cases were such as Dr. Des Vœux was unable to *cure* by other medical means at his disposal, and, if so, I think it is a point he should have laid stress upon.

It is common experience in these very diverse cases to find that tonic treatment—a rest in the country, a course of stomachics or purges will *relieve* the patient possibly for some months, but they do *not cure*, and recurrence is certain until an exact correction is made and the glasses are worn constantly.

I feel that the difficulty in explaining the meaning of eye-strain, the exact path of impulses to the sensori-motor cerebral cortex, the condition of the sensory cortical cells which makes them abnormally respond to a summation of stimuli and the paths by which they expend their energy in conducting impulses to the periphery, are the chief causes of so much scepticism by those who have not had ample clinical proofs. If a neurologist could make all these points clear much prejudice would be removed. It *is* remarkable that the correction of a quarter or even an eighth of a diopter of astigmatism should give so much relief; but if one considers that the ciliary muscle is straining to overcome the defect every minute of the waking hours, the summation of stimuli must be enormous. As Mr. Wilson points out,[1] many people with astigmatism do not suffer from headaches, but they may suffer from other troubles pointing to deficient nerve energy, such as lack of concentration, rapid fatigue, nervous irritability—the number of bad tempers that can be cured is amazing!—&c. Theorising, I suggest that the prime seat of the trouble is in some abnormal condition of the cortical sensory cells of the sensori-motor area, some change in their molecular composition making them react abnormally to unwelcome stimuli. If this is granted, it is not difficult to see that very diverse functional troubles may arise from their disorder. The paths of impulses, the question of the nature of the sensory stimuli in the ciliary muscle, whether due to stimulation of the sensory receptors in the muscle, &c., come rather more into the sphere of the physiologist or neurologist than of the ophthalmic surgeon.

In the *Practitioner* of May, 1912, writing on the subject of eye-strain, I anticipated relieving epilepsy by the relief of eye-strain, especially where the family history was good, but I was unsuccessful until some 12 months ago. I quote the following case as it is full of interest:—

Jan. 20th, 1917.—Female, aged 20 years. Family history good. Father and mother, four sisters, and one brother alive and healthy. The mother suffered from fits 29 years ago, previous to the birth of the second child—probably eclamptic. From the age of six months to seven years the child suffered from fits which were always diagnosed as epileptic. At seven years she developed otorrhœa; whilst the ears discharged she did not suffer from fits, but as soon as the discharge was cured the fits returned. At the age of 14 and 15 years she had three attacks per week regularly; she then improved, but at 18 years of age the fits were worse and she developed nocturnal attacks, during which she sometimes, but not always, unconsciously passed urine. The last attack, early in January, 1917, she described as a very bad one.

She has attended Queen's Square Hospital for Epilepsy for 12 months recently, but obtained no relief, and they were diagnosed as undoubtedly epileptic in nature. There is a transverse scar across the top of the nose through falling in the last fit. She has only suffered from headaches during the last two years. Her doctor advised her to have her eyes examined.

On Jan. 20th, 1917, her refractive error was investigated, and hypermetropic astigmatism against the rule in the right eye and oblique in the left was discovered—viz., + 0·50 D. cyl. ax. nor. right eye and + 0·37 D. cyl. ax. 45° left eye (down and in). These were ordered to be worn constantly. The muscular eye balance was normal. She reported on Oct. 19th, 1917, that she felt quite different and had not had a single fit since she obtained her glasses, and had not taken a dose of medicine. A request that she should not wear her glasses for a month in order to see if the fits returned met with a decided refusal, so that the case cannot be regarded as quite complete.

In some cases of neurasthenia where only partial relief is obtained there is no doubt some other causative factor or factors; nevertheless, all these cases should have the benefit of having their eye-strain relieved. The secret of success in all these cases in correcting their refractive error under a cycloplegic is infinite exactness and patience, a gift not accorded unto all men: hence the varying results.

[1] THE LANCET, March 9th, 1918, p. 385.

Medical Societies.

ROYAL SOCIETY OF MEDICINE.

SECTION OF EPIDEMIOLOGY AND STATE MEDICINE.

Epidemiology of T.N.T.

A MEETING of this section was held on April 12th, Dr. G. S. BUCHANAN, the President, being in the chair.

Dr. W. J. O'DONOVAN (Chief Medical Officer, Welfare and Health Section, Ministry of Munitions) read a paper on the Epidemiology of T.N.T. This was in effect a continuation of a chapter in preventive medicine begun at a meeting of this society in January, 1917.[1] The ill-effects of T.N.T., dermatitis, gastritis, toxic jaundice, and aplastic anæmia were discussed. Stress was laid on the necessity of regarding all cases of purpura or uterine bleeding with the greatest suspicion, as these symptoms may represent the onset of fatal aplastic anæmia. Thirteen of these cases of grave anæmias are known of which only one is to-day alive. Toxic jaundice is now a rare phenomenon, and the death-rate has fallen considerably; in the last quarter of 1916 there were 23 deaths, and only 4 deaths in the corresponding period of 1917. In stamping out toxic jaundice and with it the minor illness due to T.N.T., which reached 11 per cent. of the operatives at one factory in August, 1916, the coöperation of the engineers was invaluable. Clean working is essential, and automatic working is the only way of securing this with thousands of unskilled female workers. Photographs were shown on the screen illustrating the various processes on which T.N.T. absorption might occur, and other photographs showed the various types of automatic machinery that had largely helped to eliminate hand contact. Skin varnish had not proved such a success in practice as experimental work had led one to hope. Respirators were of little or no service, and the use of gloves except for hot or rough work is discouraged, as workers cannot keep the interior of gloves free from T.N.T., and a poultice of T.N.T. on a hot hand is the ideal way to secure absorption. The chief precautionary measures—alternation, periodic medical examination, clean working, and ventilation—were discussed, with detailed reference to managerial, explosive, and wages aspects with which these points are bound up. Recognition was paid to the work of the T.N.T. factory medical officers, working continuously for months in isolated areas with none of the amenities of ordinary medical life. Attention was drawn to the variability of the incidence of the effects of T.N.T. at the same factory, suggesting that the pathological ill-effects may be coincident, but are not necessarily dependent on one another. The way in which factories were separately attacked after varying periods of freedom and the absence of fresh cases under constant working conditions suggested that two factors came into play—one the toxic effect of T.N.T., and secondly, possibly a portal infection. The work of Opie in producing experimental cirrhosis of the liver in animals, and a recent paper by Dr. Stuart McDonald[2] on acute atrophy of the liver after the administration of salvarsan, lent support to this view, which, however, was an open question. Reference to a publication by Simeon Snell[3] dealing with poisoning by di-nitrobenzol, showed how closely parallel were his recommendations to those of the T.N.T. Committee appointed by Dr. Addison when Minister of Munitions; no cases of peripheral neuritis, or of amblyopia, due to T.N.T. had been known to have occurred.

Dr. T. M. LEGGE, Colonel O'REILLY, R.A.M.C., Dr. EDGAR COLLIS, Dr. CHRISTINE PILLMAN, and Dr. A. S. MACNALTY took part in the subsequent discussion.

SECTION OF OTOLOGY.

Aural Bacteriæmia.

AN ordinary meeting of this section was held on April 19th, Dr. H. BANKS DAVIS, the President, being in the chair.

Mr. RICHARD LAKE read a paper entitled "Aural Bacteriæmia." He defined it as a condition in which living bacteria or bacilli were found free in the blood, and it must be distinguished from that in which there was an accidental entrance of bacteria into the blood, such as in pyæmia, with a definite infecting focus. He considered there were two classes of bacteriæmia. In one the inhibitory power of the blood very rapidly destroyed the bacteria, while in the other variety some influence kept that power in abeyance. The chief indication of the presence in the blood of free bacteria was afforded by the height of the temperature. The usual infecting organism in bacteriæmia was a variety of streptococcus; staphylococcus was more rare. The subjects of the condition were usually young, many of the patients being children. In aural cases one found mastoiditis, of recent origin or having lasted some little time, but not what could be defined as chronic suppuration. Frequently in the cases there was neither sign nor history of aural discharge, nor was there any trouble in the middle ear. There might be, however, posterior bulging of the meatal wall and tenderness of the mastoid process. Though the temperature in these cases ranged between 100° and 105° F., there might be no history of rigors. He had seen only one case of rigor in this condition, and he regarded this as the chief point of differentiation from pyæmia. Patients with bacteriæmia were not only not dull and stupid, but had bright eyes and seemed to be subject to cerebral stimulation; delirium was absent and the cerebro-spinal fluid normal. Operation might be followed by a fall of temperature, but only temporarily. If not complicated by or associated with pyæmia the prognosis was not serious. If in any case he had reason to suspect the mastoid as the source of infection he would open it, even though examination of the blood showed a diminution in the number of bacteria present. He insisted on the removal of every likely source of suppuration and the simultaneous employment of autogenous vaccine, stock vaccine being used until the autogenous could be prepared. He also used urotropine in full doses with a liberal supply of normal saline solution by cutaneous injection or by the rectum. Even in children a quart of saline could be used, and in adults four times that quantity. Any tendency towards the urotropine having a bad effect on the kidneys was, he considered, counteracted by the dilution produced by the saline. He quoted several cases.

Mr. T. MARK HOVELL pointed out the great value of collosol argentum in general septicæmia. In one case 5 c.cm. injected in such a case following confinement brought down the temperature from 104° to 99° in a few hours, and a subsequent similar dose reduced it to normal, with no further rise.

Dr. W. JOBSON HORNE considered that in a case of suppurating ear, even if a free growth of staphylococci or streptococci resulted from a blood culture, it did not follow necessarily that the ear was the cause of the bacteriæmia.

Dr. DAN MCKENZIE feared the presence or absence of bacteriæmia in a case did not materially help in the recognition of lateral sinus thrombosis. Certainly, after a rigor one expected to find a thrombus in the lateral sinus, and in all cases of doubt he strongly counselled the opening of the sinus, as that procedure left the patient none the worse.

Dr. P. WATSON-WILLIAMS expressed his agreement with Dr. McKenzie's view. He believed in the free use of the anticocci sera, even 30 to 40 c.cm. in the first 24 hours, and 20 c.cm. on the following day.

Mr. W. STUART-LOW was anxious for help to avoid so many cases being brought to specialists for operation tragically late. These cases of septicæmia were often so urgent that he felt the giving of vaccines and urotropine was wasting precious time. Operation was what he relied on.

Mr. J. F. O'MALLEY thought it very important to be able to differentiate between bacteriæmia and pure sinus thrombosis resulting from acute mastoid suppuration, but usually the problem was a very difficult one, as was exemplified by a few cases which he quoted.

Mr. C. E. WEST said the degrees of blood infection were so varied, and shaded into each other so much, that it was a mistake to introduce a terminology aiming at a differentiation. He spoke of a non-suppurative type of case sometimes met with in which there was exquisite hypersensitiveness at certain spots, with an oscillating temperature. Believing these to be akin to rheumatism, he gave large doses of salicylate of sodium or aspirin.

Dr. A. WYLIE placed great reliance on the intravenous injection of 5 c.cm. of 1 in 1000 perchloride of mercury solution to reduce the temperature accompanying pyæmia.

Mr. G. H. L. WHALE, Dr. E. M. WOODMAN (Birmingham), Dr. W. H. KELSON, and Mr. SOMERVILLE HASTINGS also briefly discussed the subject, and Mr. LAKE replied.

[1] THE LANCET, 1917, i., 185.
[2] Brit. Med. Jour., Jan. 19th, 1918. [3] Ibid., March 3rd, 1894.

Reviews and Notices of Books.

I. *The Diagnosis and Treatment of Venereal Diseases in General Practice.* By L. W. HARRISON, D.S.O., Lieutenant-Colonel, R.A.M.C. Oxford Medical Publications. London: Henry Frowde and Hodder and Stoughton. Pp. 482. Price £1 1*s*.

II. *Syphilis.* By LOYD THOMSON, M.D. Philadelphia and New York: Lea and Febiger. Pp. 415. Price $4.25.

I.—Colonel Harrison's extensive experience of both the clinical and pathological aspects of venereal diseases has enabled him to lay before his readers something more than a mere survey of our present knowledge. He has no use for the old descriptive catchwords and his graphic accounts of syphilitic lesions convey an impression of keen observation and leave the reader with a clear mental picture. Theoretical and pathological matters are touched upon in so far as they are of immediate interest to the general practitioner. The author's experience having been what it is, it is natural that he deals specially with the male patient, but we hope that in subsequent editions a little more space may be devoted to the treatment of gonorrhœa in women and children.

A few practical points may be instanced. As a routine treatment for soft sores, bubo, and epididymitis the author advises respectively rubbing in sublimated sulphur, aspiration, and acupuncture, and these methods appear in the great majority of cases to give better results than other older ones, such as iodoform, incision, and fomentation. He is convinced that in gonorrhœa irrigation into the bladder is preferable to anterior irrigation, even in cases where the infection appears to be confined to the anterior urethra—an opinion by no means invariably held. The various manifestations of intolerance to arsenic and their treatment are fully dealt with and deserve careful attention. In the chapter dealing with the interpretation of laboratory reports Colonel Harrison states his own opinions strongly. He considers that a negative Wassermann reaction is, as a rule, of little value in excluding syphilis and that a positive reaction justifies a diagnosis of syphilis if a short list of easily excluded and mostly tropical diseases are first eliminated. There are, however, a number of observers who hold that a negative W.R. of the cerebro-spinal fluid excludes, or almost excludes, G.P.I., and recently many contradictory W.R.'s have been reported, positive results being obtained in cases where no syphilitic history was elicited, and where the lesions did not clear up under energetic antisyphilitic treatment. Wide agreement will be felt with the author's plea that microscopical as well as clinical examinations should be undertaken in the consulting-room; although a considerable degree of bacteriological experience is required in cases presenting evidence of mixed infection, if errors in diagnosis are to be avoided.

The book is well printed in large type on excellent paper and contains 16 coloured plates, some original, others taken from D'Arcy Power and Keogh Murphy's "System of Syphilis." Eighty-four useful illustrations are included in the text. Every medical officer in charge of a venereal treatment centre should possess this book, and it will prove a welcome addition to the bookshelf of the general practitioner.

II.—In this work Dr. Loyd Thomson gives a general survey of syphilis, with an interesting account of the opinions and treatment, both general and special, of the author and other syphilologists practising at Hot Springs, Arkansas, a spa which he describes as the "Mecca for syphilitics in America."

The author considers that the Wassermann reaction may be itself, or may be associated with, an immunity reaction, a view not usually held in this country, but he also considers that it is an indication of the presence of living treponemata in the body, and he therefore forbids marriage even after prolonged treatment and absence of all clinical manifestations, if the W.R. is positive. He admits that contradictory W.R.'s are frequently obtained, but considers such results due to faulty technique, and that though yaws, leprosy, and malaria are likely to give a positive Wassermann, as these infections can easily be excluded, errors in diagnosis are unlikely. He recommends that all prisoners and immigrants should be subjected to the W.R with the view of eliminating possible sources of infection—a somewhat drastic procedure. The author's account of the luetin reaction leaves the impression on the reader's mind that this test is of no great value for diagnosis.

The treatment advocated in this book varies considerably from that generally employed in this country. The author invariably uses the soluble preparations of mercury, preferably the benzoate, for intramuscular injections, and if the patient objects to the slight pain he employs as an alternative method the intravenous injection of mercurialised serum. Of the arsenic preparations he prefers salvarsan, but rarely gives a dose of over 0·4 g., stating that such doses are fully as potent as larger ones. He does not state the number of intravenous injections of salvarsan that he employs in a course of treatment, but his remark "in the majority of cases more than one dose of salvarsan is necessary" seems to indicate that he does not consider a series of seven or more as usually given in this country as either necessary or advisable. In the author's opinion intramuscular injections of arsenic preparations are contra-indicated owing to the liability of the production of areas of tender induration which may persist for months. The occasional deaths that have followed salvarsan treatment are ascribed by the author to faulty technique rather than to arsenic poisoning, an opinion with which we cannot entirely agree. If inguinal adenitis proceeds to suppuration incision and curettage are recommended, and no mention is made of aspiration and injection with iodoform emulsion or tincture of iodine, a method that has frequently obviated incision in this country.

The book is clearly expressed and well printed on good paper and contains numerous useful engravings illustrating the text and also six coloured plates, two of positive luetin reactions and one each of the Wassermann reaction, Lange's colloidal gold test for cerebro-spinal fluid, syphilitic retinitis, and interstitial keratitis.

The Conduction of the Nervous Impulse. By KEITH LUCAS, Sc.D., F.R.S. London: Longmans, Green, and Co. 1917. Pp. 102. Price 5*s*.

THIS is the third of the series of monographs in Physiology which are being issued under the editorship of Professor E. H. Starling. At the time of the author's death it was unfinished, and it was left to Dr. E. D. Adrian to complete and edit the monograph. The main thesis of the author is that the key to many, if not all, of the problems of conduction in the central nervous system is to be found in the study of conduction in peripheral nerve. The advantage of attacking the problem through such study is that in the muscle-nerve preparation it is possible to control experimental conditions to a degree which is out of the question in the central nervous system, and therefore it is possible to analyse the process of conduction much more completely in the former than in the latter case. The author then proceeds to show that the characteristics of peripheral conduction are such that many of the features typical of conduction in the central nervous system can be reproduced in a muscle-nerve preparation. The chief method employed in the study of peripheral conduction consists in introducing, in what he calls a region of decrement, a partial block to the passage of an impulse along the nerve, and then determining the various conditions which influence the passage of subsequent impulses through the obstruction; in the hands of Keith Lucas and of Adrian the method has shown that a single impulse, reduced in intensity by passing through a region of decrement, recovers completely when it emerges into a tract of normal nerve. After dealing with the evidence which shows that the passage of an impulse along a nerve is followed first by a refractory period during which it fails to conduct, and secondly, by a period of exaltation in which conduction is super-normal, the author discusses how far these facts suffice to account for the phenomena of summation and inhibition in central and peripheral tissues. He concludes that, admitting conduction with a decrement to be a normal event at the neuro-muscular junction and probably also at the synapse, the altered conductivity following the passage of an impulse along a nerve offers a satisfactory explanation of both summation and inhibition. In a final chapter some of the difficulties of explaining central inhibition and rhythm are considered.

Although the problems under discussion are among the most difficult in physiology, the monograph is written with a sureness of touch, and with an ease and lucidity of style which makes discussion easy to follow; and its publication must produce in the mind of every reader a sense of the loss which science has sustained through the untimely death of the author.

THE LANCET.

LONDON: SATURDAY, APRIL 27, 1918.

The Problems of Nutrition.

IT is the satisfactory outcome of the closer attention now being given to the problems of nutrition that theory in regard to food requirement and practice in regard to food employment are being brought into line. One of the most noteworthy developments of the present position of acute and general interest in food-supply is that the Royal Society is now definitely influencing what comes to our tables. The public idea that the proceedings of the Royal Society have interest for a few ultra-scientific persons and are without general interest was, of course, always quite wrong, and for many years has been demonstrably so for all who would look at a demonstration; but when the Society was early in the war constituted a tribunal on food questions, advanced science came into its own as a supreme mentor in popular trouble, and did so in a form which all could appreciate. The historic body, in putting forward its expert physiological strength (apart from other departments of science) to guide our legislators in the matter of limitations of food, levied upon us by a world's shortage, has discharged well the call on its great resources. It may be true that at the outset we seemed to be almost plagued with calculations as to the calorific values of foodstuffs, and the consequent reckonings of efficient allowances. But research and advice did not stop at this point, and there has developed a deeper study of what might be described as the wherewithal of calories. The question of calories became insistent in asking whether the organism could put trust in materials hitherto placed largely outside the pale of an ordinary dietetic curriculum. Vegetarianism was scorned by physiological and lay authorities alike in times of meat plenty, but scientific investigators now are urgent in justifying that food energy can be found easily enough in vegetable products, and that animal sources of food no longer rank as staples in regard either to protein or fat.

We learn constantly from modern researches of the superior value of carbohydrates in muscular activity, and a fact of peculiar importance elicited in recent experiments is that the call on an energy output of the body is independent of bodily condition. Whether the subject is in the best nutritive condition or not, or even reduced by fasting, the call on energy required to do a definite amount of work remains the same. This consideration brings into importance the value known as "resting" or basal metabolism, representing the amount of heat, as measured in calories, which is produced by an individual lying in bed completely relaxed—a stage at which the human furnace, so to speak, is banked up for the night and the oxidising activities reduced to a minimum. The "resting" output amounts to 1 calorie per kg. of body weight per hour, according to a large number of concordant observations, and this figure appears to be true for quite wide ranges of body mass. On such a basis the added demands on food created by energy are superposed, and the metabolism of varied occupations forms an interesting comparison with the basal metabolism. We offer no apology for quoting again the brilliant work of Professor LUSK, who gives in the *Journal of the American Medical Association* of March 23rd a series of charts, setting forth the metabolism of boys from birth to 16 years of age, the metabolism of soldiers, and of men and women engaged in industrial pursuits. The sum-total of this investigation confirms what we have already stated, that while the basal requirement of energy may be reduced by under-nutrition amounting to a very material economy of food, yet to accomplish a given amount of work a fixed amount of food is required irrespective of the nutritive condition of the organism. The simile of an engine occurs again: at rest the fire must be kept going, but increased fuel must be piled on when the work of traction begins. Fuel, however, has variable values, and this is true in a physiological sense when fuel connotes food. While we are told that carbohydrates afford all the muscular activity required of the active human organism, we cannot leave out the question of adaptability to environment. It is difficult to suppose that the Eskimo could, without serious disadvantage, forgo his supply of fat blubber in favour of rice. Professor LEONARD HILL has investigated the metabolism of eight persons who sat quiet for successive half-hours, first in a room and then on the roof of a London building exposed to cold wintry weather. Analysing his data by the Zuntz-Schumburg method it was found that the mean heat production indoors was 1·32 calories. Resting outdoors it was 2·00 calories, an increase of more than 50 per cent. It is quite obvious from this result that under conditions favouring rapid loss of heat or moving air a transformation of energy is involved in excess of the normal requirements of the work itself. In all calculations as to bodily needs, therefore, the influence of externalconditions is a factor which cannot be ignored.

We publish this week two articles dealing with different aspects of dietary problems, and both conveying practical lessons behind which lie profound scientific truths. They illustrate how work in the highest regions of science emerges as a piece of counsel for the public. Professor A. D. WALLER continues his observations, begun in THE LANCET just over a year ago, upon the diet of a sedentary worker, by comparing the results to the worker when unrestricted and restricted in his food-supply. His conclusion, based upon personal experience, is that brain-work calls for no supplementary rationing, and, frankly, we fail to find in his second article any evidence of diminished brain-power. Dr. EDMUND SPRIGGS dismisses as without foundation the numerous statements that war bread produces pathological

conditions in the healthy, or aggravates those conditions in the unhealthy. These are two very significant messages on matters that are being discussed hourly by the public; they are simple to understand, but they could never have been delivered with confidence had not their accuracy depended upon just those scientific qualities of research for which the Royal Society stands.

The Belgian Doctors' and Pharmacists' Relief Fund.

AGAIN we are able to publish a long list of subscriptions in reply to the second application for support to the Belgian Doctors' and Pharmacists' Relief Fund, and the Committee of the Fund are profoundly grateful to the medical and pharmaceutical professions of the country for coming at this period of general stress to the assistance of our luckless Belgian colleagues. The money received during the past fortnight will enable the executive body of the Fund to resume, though probably not at the original figure, the subscriptions which for two years have been sent out to the committee of Belgian doctors and pharmacists sitting in Brussels, and through that committee distributed in accordance with the known needs of the sufferers. And sad indeed are those needs, nor do they grow lighter or the oppressions of the German occupiers less harsh as time goes on. But subscriptions received during the past fortnight only re-establish for two months at most the possibility of sending a large monthly grant to the Brussels Committee, while it is earnestly desired that the Fund should continue its help to the cruelly wronged Belgian doctors and pharmacists, without any abatement from its former substantial figure, until the close of the war. It was known to the Executive Committee of the Fund when the second appeal was made that many of the constituency from whom subscriptions could be expected were among the substantial losers by the war, in addition to feeling in common with the whole of our population the strain of vastly increased taxes and a huge rise in price of all commodities. It was known that every sovereign given now would represent in the self-sacrifice of the donor a far larger sum, and that, if only for that reason, the task of reaching the total previously obtained would be very hard.

But the second appeal had to be made. It had to be made because of the definite evidence in the possession of the Committee that the unfortunate medical men and pharmacists remaining in Belgium counted eagerly upon the support which it had been possible to send, so that its discontinuance would mean leaving in the lurch our valiant, patient, and hopeful allies. With such proof of good work done by the Fund as is in the possession of the Committee, on the testimony alike of the succoured Belgians and of the Commission for Relief in Belgium, it is felt that a stop in the work would be nothing less than a tragedy, and that any public failure must be risked rather than a tame surrender to circumstances acquiesced in. Hence, this second appeal in untoward, nay, in desperately unfortunate, circumstances. The appeal has not been a failure, and we take this opportunity of thanking in the warmest possible way those who have already attempted to make it a success; but, though it is not a failure, it cannot be called a success. Far more money—at least ten times as much money as has been obtained—is wanted, and wanted quickly, if the Fund is to be placed on a footing that would entitle any word to the beneficiaries that the helping hand will not be withdrawn. But what would answer the purpose of a large sum in capital is a regular series of monthly instalments, and such a method of subscription to the Fund is now provided by the Executive Committee. We draw our readers' attention to this plan with emphasis. May we beg all those who do not feel that they are justified in sending a substantial sum of money now, to make arrangements to fill up an order on their bankers for monthly subscriptions. If a few hundred medical men would do this, the Fund might in its second version attain to the distinct success of the first: we could ensure a succession of mensualities to the organisation in Brussels, and gain time for collecting a capital sum.

Annotations.

"Ne quid nimis."

THE PREVENTION AND TREATMENT OF MALARIA.

THE prevention of disease in the strict sense of the protection of an uninfected person from infection by means of prophylactic measures is a matter on which scientific evidence is badly needed. Quinine, for example, has been used among our troops in varying dosage with this object in view, but we do not know of any record of experiments conducted with adequate controls in which, say, one-half of a certain body of troops exposed to infection were given quinine and the other half were not. Had such an experiment proved the failure of a particular dose—e.g., 5 gr. daily—then it should have been repeated with 10 and 20 gr., or the test objects might have been divided into a corresponding number of groups. Thus within a period of weeks or even days the question could have been settled and the prevention of malaria by the routine administration of quinine placed upon a sound basis of experimental knowledge. In the absence of such knowledge the adherents and opponents of quinine prophylaxis still bandy words and quote the opinions of authorities in their support. It is something of a reproach to scientific preventive medicine that the matter is still in dispute. Malaria prophylaxis is a subject that may interest us even in this country. A handful of indigenous cases of malaria were reported in 1917, most of which arose under conditions which the epidemiologist might have anticipated—viz., imported cases of the disease and the presence of anophelines. The latter exist in practically every county, and it is curious that although the requisite conditions were widely present only single cases occurred. A similar observation was made in France, where only isolated indigenous cases were noted. It has been argued on theoretical grounds that the number of

anophelines is a factor of importance. Within certain limits this obviously must be so, but we have conclusive evidence that malaria may be intense in an area where the infecting anophelines are scanty. Judging by last year's experience, it is unlikely that malaria will become epidemic here. So much for prevention. With regard to treatment, the heresy promulgated some few years ago that intramuscular injections are not effective in controlling a paroxysm still survives. This particular statement appears to have been founded on an inference from the observation that quinine was found post mortem in the site of an injection. The sceptic who is not convinced by the experimental evidence already published would be well advised to take a series of cases showing simple tertian parasites in the blood during a paroxysm, to administer one or more intramuscular injections (even undiluted), observing the temperature chart and examining the blood after an appropriate interval. A personal experience such as this brings conviction. It may be granted that the control of the malaria paroxysm is a simple matter, whether by intramuscular, intravenous, or by oral administration, but the cure of the disease is an entirely different matter. We are learning what the text-books did not tell us—that the cure of simple tertian malaria is a most difficult matter, and we are becoming suspicious that our so-called quinine cures may not be entirely due to the drug itself, but rather to a naturally developing immunity. In one respect, however, our knowledge is more exact. Hitherto the methods of detection of quinine in the blood and its estimation in the urine were inaccurate. The new and accurate methods recently discovered permit of the re-examination of the whole subject, and we hope for further light on the exact significance of quinine "habituation," if it exists, and the advance in practice which this knowledge would give.

PRESENT-DAY APPLICATIONS OF EXPERIMENTAL PSYCHOLOGY.

IN the first of his two recent lectures at the Royal Institution Lieutenant-Colonel Charles S. Myers, R.A.M.C., dwelt mainly on the application of psychological experiment to industrial efficiency. Laboratory researches on mental and muscular work had shown the relation existing between rest and length of task, the importance of determining and employing the optimal load, and the various psychological factors which affect the work curve. A study of these factors brought out the economic value of introducing scientific management and systematic rest pauses in the workshops and of selecting by appropriate tests employees fitted for tasks demanding special ability. There was, he said, a wide difference between the increased production due to scientific shorthand methods in industrial efficiency and that due merely to the dangerous process of speeding-up. Real industrial efficiency would result from the establishment of vocational bureaux, where lads and girls on leaving school were psychologically examined, and advised on the basis of this examination, supplemented by a dossier of opinion collected during their school career, as to the occupation for which each was best fitted. In his second lecture Colonel Myers passed on to the subject of nervous breakdown and the crucial importance of its early and skilful treatment in industrial life. Psychologists are now alive to the preponderating influence of the feelings, in the light of which current conceptions of memory, of personality, and of consciousness required to be revised. A case in point was brought forward by Colonel Myers, who mentioned the danger attending the apparent cure of contractures, paralyses, tremors, and other functional bodily disorders when practised without reference to the psychic disturbance from which they arose. He concluded by impressing the need for continuing and even developing in peace-time the special hospitals and the special psychological training of doctors which had been found essential in order to deal with the effects of war strain.

THE IDENTIFICATION OF THE MENINGOCOCCUS.

THE *Journal of the Royal Army Medical Corps* for January and February contains three interesting communications dealing with the bacteriology of cerebro-spinal meningitis. 1. Captain W. J. Tulloch discusses the mechanism of the agglutination reaction and records some experiments bearing upon the question. In the second part of his paper he presents the results of agglutination and absorption tests which he performed upon a large number of presumptive meningococci, using the four-type agglutinating sera prepared upon the basis of Lieutenant-Colonel M. H. Gordon's classification. He found that of these 66 per cent. could be unequivocally placed in one of the four groups by agglutination alone. A further 26 per cent. reacted with two sera of allied groups, but of these the majority could be placed definitely in a single group by the application of the absorption test. Twenty-three strains (6·5 per cent.) reacted with two or more sera without any group connexion, and three of these were equally, though feebly, agglutinated by all four sera. By absorption tests, however, most of these could be placed in a definite group. Group II. was found to be complex. Finally, 2 to 3 per cent. of strains failed to respond to any of the sera. Thus, some 98 per cent. of the cocci could be identified as meningococci by the quadruple agglutination test, and the majority of these were susceptible of classification into four fairly well defined, though inter-related groups by means of agglutination and absorption tests carried out with four sera selected by Colonel Gordon for the purpose. Captain Tulloch's experiments are thus in full agreement with Colonel Gordon's previous work, and they afford evidence that the four-type system provides a trustworthy means of identification of the meningococcus as a whole. At the same time, they contain a strong suggestion that the division into four groups may not represent a complete statement of the true biological relationship of the various individuals of this species. The linking of the four groups into two pairs, the recent subdivision of Group II., and the existence of a number of strains which present individually almost every possible combination of reactions with the four sera, and thus bridge the gaps between the groups, all suggest the possibility that the differences between strains may, in fact, be of a quantitative rather than of a qualitative nature. Much further investigation is required to show whether Colonel Gordon's classification is more than a stepping-stone on the path of knowledge. 2. Colonel Gordon gives an account of the steps of his researches on the meningococcus which led to the routine adoption by the Royal Army Medical Corps of the agglutination test for the identification of that organism, and to the establishment of the

Central Cerebro-spinal Fever Laboratory, and he gives a full account of the methods in use there. He accepts Captain Tulloch's subdivision of Group II. into three distinct subgroups, but he does not consider that this upsets his main classification. He concludes with an inquiry into the reasons for the failure of other recent investigators to arrive at conclusions identical with his own. 3. Captain J. A. Glover gives an instructive description of the bacteriological aspect of a cerebro-spinal fever epidemic at "X" Depôt in 1917. The relationship of the incidence of the disease to cold weather and overcrowding is clearly brought out, and a striking premonitory rise of the carrier-rate before the incidence of the first case is shown. Of the 14 meningococcal strains isolated from actively infected men, 13 were identified with Gordon's Type II. and one with Type I. In an outbreak at the same depôt in the previous year Type II. coccus had been isolated in every case, and the same type became predominant in the premonitory rise of the carrier-rate in the present epidemic. Captain Glover ends with an account of a prophylactic scheme for 1918, which has been elaborated as the outcome of the experience and laborious investigations described in this paper.

THE EARLY DIAGNOSIS OF SCIATICA.

THE clinical and medico-legal recognition of sciatica is not infrequently attended with considerable difficulties, especially when, being as yet in an early stage, definite objective symptoms of atrophy and hypo-reflexivity are wanting. This problem, owing to present war conditions which have increased the numbers of cases suspected of malingering, has thus become more urgent and important, and new and more accurate researches on the subject assume a greater interest. Dr. Andrea Roccavilla has recently (*La Riforma Medica*, Feb. 23rd, 1918) described several new signs which may be helpful in forming an accurate diagnosis in doubtful cases where the usual classic symptoms are absent or not as yet fully developed. We give a résumé of the more important of them:—

(1) Painful hypersensitiveness in the testicle of the affected side. In cases of true sciatica there is marked hyperalgesia on pressing the testicle between the fingers, evidenced as genuine by pupillary contraction, increased pulse-rate, and arterial hypertension. It is more sensitive than the evidence obtained by pinching the adductor muscles of the thigh and than the so-called Gibson's sign, exaggeration of cremasteric reflex, although it is in direct physiological relation to them.

(2) Sacro-coccygeal tenderness by digito-rectal examination. Pressure on the pelvic wall on the affected side by the finger in the rectum causes pain, more intense than that produced by pressure on the first and second sacral spines or on the femoro-gluteal fold and along the course of the sciatic nerve (signs of Trousseau and Valleix).

(3) Diminution of electrical resistance in the limb. Each leg is successively immersed to the same level in a bath connected with one electrode, the other electrode being in contact with the limb under examination. The difference between the resistance of the affected and healthy limb may be as much as 5–6 milliampères. In less severe or early cases the variation between the two limbs is less evident, but the proportion of cases in which this sign is positive and appreciable (2-3 milliamperes) is as high as 7 or 8 in 10, and the importance of the symptom lies in its being objective.

(4) Popliteal hypo-reflexivity. External and internal popliteal reflexes can be elicited by striking with a clinical hammer the tendons of the semi-membranosus and semi-tendinosus muscles on one side and those of the biceps femoris on the other, about two fingers' breadth above the middle horizontal line of the popliteal space. The importance of the investigation of these reflexes lies in the fact that whereas these three muscles are supplied by branches from the sciatic nerve, the reflex spinal centre is at a higher level than in the homologous achillar tendon reflex, which may be of value from the point of view of early or doubtful diagnosis. But the popliteal reflexes in sciatica do not invariably follow the general rule of hypo-excitability, for exceptionally and especially at the onset of the disease they may, like the achillar reflex, be exaggerated; this period, however, is of short duration, for even before signs of neuritis appear the popliteal reflexes become progressively feeble and finally abolished. Contemporaneously with this period of onset a curious phenomenon may be observed, which consists in a simultaneous existence of a popliteal hypo-reflexivity with a patellar hyper-reflexivity, so that a very slight stimulation of the upper tendinous boundaries of the popliteal space produces a marked extension, instead of flexion, of the leg on the thigh (inverted reflex)—i.e., the stimulus is propagated to the patellar tendon instead of exerting itself on the tendons struck.

(5) Dissociation between the idiomuscular contractility of the gastrocnemii and the achillar tendon reflex. This sign is evidenced by a contemporaneous hypo-excitability of the Achilles tendon with an idiomuscular hyper-excitability of the belly of the gastrocnemius, as shown in flexion of the leg on the thigh following percussion on the lower part of the muscles, so that while mechanical stimulation of the Achilles tendon does not produce the usual extension of the foot, or does so in a very slight degree, analogous excitation of the muscular mass determines a flexor reaction of the leg to a much greater degree than normal. The importance of the sign lies in its early appearance and in the fact that it is most evident precisely at a time when the majority of the other symptoms have as yet to reach their full development.

(6) Behaviour of the small reflexes of the foot. These show early appreciable modifications, in that, after a period of transitory hyper-excitability, which coincides with the initial phases of the disease but which may be altogether absent, they undergo progressive enfeeblement until their complete disappearance. This occurs in about 7 cases out of 10.

Dr. Roccavilla furthermore draws attention to the following important facts. In cases where the lesion, instead of being total or truncal, is purely fascicular or of the ascending type, then Lasègue's crossed sign and Gibson's are not very marked, whereas Gowers's sign and those relating to the Achilles tendon and small muscles of the foot and plantar hypo-reflexivity are strongly so. Vice-versa, in cases where the sciatica is truncal and descending there will be prominence of Gibson's and Trousseau's signs, hyper-albuminosis and lymphocytosis of the cerebro-spinal fluid, rectal hyperthermia and hyperalgesia, testicular tenderness, adductor phenomena, hypotrophy of the thigh, and popliteal hypo-reflexivity.

THE INCIDENCE AND TREATMENT OF AMŒBIC DYSENTERY CARRIERS.

IN THE LANCET of April 6th we drew attention to several articles we had been able to publish dealing with the treatment of amœbic dysentery carriers. We have received, through the courtesy of the Medical Research Committee, a copy of No. 15 of their Special Report series dealing with a study of 1300 convalescent cases of dysentery from home hospitals, with special reference to the incidence and treatment of amœbic dysentery carriers. The authors of this very interesting report are Mr. Clifford Dobell, Mr. H. P. Gettings, and Miss Margaret W. Jepps (all working on behalf of the Medical Research Committee), and Dr. J. B. Stephens. No one interested in the study of dysentery—and in time of war the study of this disease becomes of paramount importance—can fail to gain information from perusal of this very careful study. It is encouraging to note that the success attending the administration of emetine-bismuth iodide in the treatment of amœbic carriers steadily increases. Analysis of their findings convinced the authors that the most successful method of administering the drug was in the form

of an uncompressed powder in gelatine capsules. A single first course of treatment (3 grains daily for 12 consecutive days) cured 90 per cent. of the cases so treated. "When cases remain uncured after such treatment the best method of re-treating them is to give them a double course of the drug (3 grains daily for 24 consecutive days). Such treatment has not cured every case, but there is no evidence that those which are not curable by this means constitute more than 5 per cent. of all carriers of *E. histolytica*."

ERYTHRŒDEMA.

WE have received a pamphlet in which, under the name of erythrœdema, Dr. H. Swift, of Adelaide, describes a condition occurring in infants, characterised by swollen bluish-red hands and feet and disordered digestion, followed by noticeable muscular weakness. At the time the pamphlet was written Dr. Swift had seen 14 cases in all, the youngest being aged 6½ months, the oldest 15 months.

The condition seems to commence with digestive disturbance with very marked anorexia. The bowels are generally opened three or four times a day, and the motions are greenish and contain undigested food particles. Sleeplessness is also common and the infant is usually restless and fretful. After a few days a characteristic appearance of the hands and feet develops; they are noticed to be swollen, bluish-red, cold and clammy, while the skin of the palms of the hands and between the fingers and toes is often sodden and desquamating. The skin of the trunk is sometimes covered with a fine papular discrete miliaria. The temperature is subnormal as a rule, the pulse is small, compressible, and rapid, and the urine is scanty, pale-straw coloured, containing excess of phosphates but no albumin. The tongue is pale and coated with a slight streaky fur; the abdomen is flaccid and retracted. No abnormality was detected in the blood in the cases examined except slight diminution of the number of red blood corpuscles in one case. Blood cultures have invariably proved sterile, and no diphtheria bacilli were found in swabs taken from the nose, throat, and ear. There is general wasting of the muscles, most marked in the larger muscles, such as those of the thigh, but no actual paralysis has been observed.

The prognosis in this condition is favourable, though convalescence is very slow, months often elapsing before recovery is complete. Dr. Swift discusses the diagnosis of erythrœdema from multiple neuritis, erythromelalgia, Raynaud's disease, and congenital heart disease. In regard to treatment, he urges the necessity of first finding some food that the infant will take and digest, often a matter of difficulty owing to the extreme distaste for food, which is one of the features of the disease. He advises great care in regard to the toilet of the skin, and recommends warm clothing. Massage to the limbs should be commenced as soon as possible. For the diarrhœa castor-oil, or small doses of grey powder, followed by bismuth, should be given. Calcium lactate in 3-grain doses three times a day seemed to be beneficial in some cases, in others it failed. In other cases ½-grain doses of thyroid gland or ¼-grain doses of pituitary extract were given. It will be of interest to know if cases of similar character have been observed in this country.

Professor W. M. Bayliss will deliver the Oliver-Sharpey lectures of the Royal College of Physicians of London on Tuesday, April 30th, and Thursday, May 2nd, at 5 o'clock, his subject being Intravenous Injection in Wound Shock.

AN EPIDEMIC OF OBSCURE ORIGIN.—Seven cases of an obscure infection among Paris children have been admitted to the medical clinic of the Hôpital Trousseau, under the care of Dr. Juste Netter, the prominent symptoms being headache and lethargy. M. Netter describes the condition provisionally as a form of encephalitis. Possibly it has some relation to the groups of toxic bulbar paralysis attributed to botulism in certain English large towns.

THE RESTRICTED DIET OF A SEDENTARY WORKER.

BY A. D. WALLER, M.D.ABERD., F.R.S.

LAST year I gave in THE LANCET a summary measurement of the daily food of a sedentary worker aged 60 and weighing 190 lb. during three days—Oct. 3rd, 4th, and 5th, 1916—on his ordinary unrestricted diet.[1] The average daily consumption for the three days came out as 2471 (inclusive of 227 cals. of alcohol), 2244 net. A subsequent observation over a period of 12 days—Feb. 27th to March 10th[2]—six days with alcohol, six without, gave a slightly higher daily average—viz., 2402 without and 2758 (with alcohol 363), or 2395 net.

Further Observations.

I thought it would be of interest to repeat the measurement this year on the same subject (age 61, weight 183 lb., height 5 ft. 8 in.) under the present conditions of moderate restriction and omitting as an unnecessary extra the item alcohol. The routine of meals was the same as last year, with slight differences in the items on the bill of fare, such as absence of meat on "meatless days" and occasional departures from an unrestricted "go as you please" as regards eating and drinking, such as coffee without sugar, soda without whisky, toast without butter. The same factors have been followed for the reckoning, the calories of protein, fat, and carbohydrate, and the percentage composition assumed for foodstuffs consumed—i.e., for bread, meat, &c.—have been the same as those employed last year.

The chief labour of weighing and calculating has been carried out by my assistant, Miss De Decker, and the checking of results has been effected, as before, by the test of coincidence between the final results of the sums, given by horizontal and vertical lines.

It is scarcely necessary to give detailed tables of figures. The figures for each day's result will be sufficient.[3] These are further summarised in graphic form as regards total energy values expressed in calories and compared with the daily results of last year's observations.

Summary of Daily Food Consumption by a Sedentary Worker, Weighing 183 lb.

TABLE I.—*During the Week March 12th to March 18th.*

	Prot.	Fat.	Carbohy.	Cal.
Mar. 12	89	90	468	3124
,, 13	77	60	467	2786
,, 14	64	55	316	2075
,, 15	91	76	433	2856
,, 16	74	68	383	2507
,, 17	74	52	466	2700
,, 18	77	65	394	2534
Average per day	78	64	418	2655

TABLE II.—*During the Week March 29th to April 4th.*

	Prot.	Fat.	Carbohy.	Cal.
Mar. 29	65	52	361	2229
,, 30	58	43	248	1660
,, 31	70	45	352	2156
Apr. 1	59	42	289	1810
,, 2	73	60	350	2289
,, 3	60	37	278	1725
,, 4	59	45	322	1976
Average per day	64	46	314	1978

	1917.	Prot.	Fat.	Carbohy.	Cal.	Weight.
I.	Feb. 27 to Mar. 3	62	98	302	2402	190 lb.
II.	Mar. 3 to Mar. 10	70·5	83	326	2395 (+ alcohol 363 cals.)	
	1918.					
III.	Mar. 12 to Mar. 18	78	64	418	2655	183 lb.
IV.	,, 29 to Apr. 4	64	46	314	1977	175 lb.

During Period II. wine containing a daily average of alcohol = 363 cals. was taken. During Period III. I ate whatever was served to me; my wife frequently tempted me to eat and the idea of food was kept prominently in mind by constant allusions. During Period IV. I was kept strictly to my share of the household supplies, and was frequently pulled up as regards my "go-as-you-please" consumption of bread, milk, butter, and sugar, but I never felt the slightest discomfort.

M. Zuntz and A. Löwy in July, 1916, reported observations upon themselves on the reduction of weight they had experienced up to date as being 10 to 12 per cent. of their former weight—viz., from 68 to 61·2 and from 56·7 to 50 kg.—"without visible effect on physical and mental efficiency."

[1] The Unrestricted Diet of a Sedentary Worker, THE LANCET, Feb. 17th, 1917.

[2] Proceedings Physiol. Soc., March 17th, 1917.

[3] For ease of reference the decimals have been omitted and the values given to the nearest whole number.

My own loss of weight (with, I believe, some improvement of physical and mental efficiency) has been from 190 lb. to 175 lb. between February, 1917, and April, 1918, and I feel quite prepared to go down a good deal further with comfort, if not benefit. I intend, as a matter of personal interest, to go down to the turning-point of my euphoria. It is very clear to me that I have heedlessly eaten too much during pre-war years.

Food Requirements.

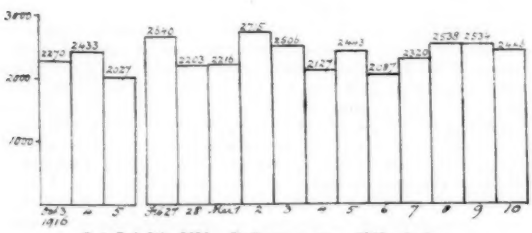
I have classified myself as a sedentary worker, although I hardly ever sit down in the laboratory, and do no work at all in the strict physical sense. I hardly ever "go for a walk," nor even walk to and from the laboratory because it costs too much time. My normal go-as-you-please consumption I consider to be 2400 calories per diem. During Period I. this year it exceeded this value by 250 calories, and I account for this excess as a result of the almost hourly reminders of food and eating problems. During Period II., when care was taken not to exceed the ration, my daily intake was lowered to approximately 2000 calories.

I feel decidedly more fit at my present body weight of 175 lb. than I did last year at 190 lb. I find myself rather more willing to work than usual.

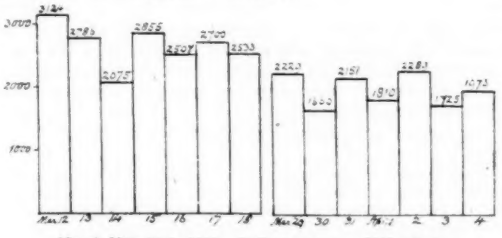
My work, however, is brain-work, not muscle-work. I am considerably surprised, therefore, at the demand made on behalf of certain classes of "brain-workers" for a supplementary ration. I am certain, in my own case, that such "work" does not call for supplementary food.

But if brain-work requires no supplementary food mechanical work requires additional fuel in strict proportion with work done. I require considerably more than 2400 cals. during holidays when at a body weight of 70 kg. My mechanical work has on certain days amounted to 140,000 KgM., but I did not attempt to estimate my actual food consumption on these occasions.

Total Daily Caloric Value of Food taken at Different Periods.



Oct. 3rd–5th, 1916. Daily average = 2243 calories.
Feb. 27th–March 10th, 1917. Daily average = 2398 calories.



March 12th–18th, 1918. Daily average = 2655 calories.
March 29th–April 4th, 1918. Daily average = 1977 calories.

The waste factor is extremely variable from zero per cent. when a loaf of bread or a pound of sugar is bought across the counter and swallowed without loss of a crumb, to cent. per cent. when meat or fish or bacon after purchase proves to be uneatable. Considered in the bulk, the waste factor may be put at 10 per cent., so that 3400 calories per man as purchased = 3060 calories, as swallowed per man, and = 2295 calories as swallowed per head.

The expression "per head" (1 head = 0·75 "man"), or as it is officially styled "per capita," refers to the population number and includes men, women, and children. The expression "per man" refers to a reduced population number arrived at by taking into account the actual numbers of men, women, and children of different ages and their different food requirements. The relation "men"/heads varies from 0·7 to 0·8, and may be assumed at 0·75, so that 3 "men" = 4 heads, or a town with a population of 40,000 heads has a "man-value" = 30,000. 3400 cals. per man "as purchased" = 2295 cals. per head as swallowed.

This value is slightly lower than that of the unit I have been accustomed to use for the last 20 years as my standard of reference—viz., a normal consumption of 2400 calories per head per day, or on the average 100 cals. per hour.

There is a further complication of the figures often introduced when the continental practice is followed of taking into account the "digestibility factor." Not cent. per cent., but only 90 per cent. of swallowed food is actually digested, absorbed, and utilised in growth and work; 10 per cent. is rejected in the fæces.

German authorities as a rule give figures in terms of "digestible" protein, &c., and in the translation of German statement into English this fact is very commonly ignored.

[4] The Food-Supply of the United Kingdom. Parliamentary Paper, Cd. 8451, July 1st, 1916.

Value of Man-Power.

Connected with the Physiol. Lab. of the University of London there is a tower staircase affording a clear rise of 20 metres. My shortest time of ascent in 1908 (body weight 75 kg.) was 30 seconds—i.e., I could work for that period at the rate of $\frac{75 \times 20}{30} = 50$ KgM. per sec. The quickest time made by an athletic young man (aged 20, weighing 60 kg.) was 15 secs.—i.e., his work for that period was at the rate of $\frac{20 \times 60}{15}$, or 80 KgM. per second—i.e., he could "work like a horse" for 15 seconds. At the same period I used to drive a motor-car, of which I had estimated the power as 8 to 10 H.-P. This car could or could not pass a horse trotting up a gentle incline, according to the quality of the horse and the apparent weight of its load, suggesting that the horse could develop, approximately, 8 H.-P. for a short spell when pressed by the driver. In 1884 I learned from Chauveau's experiments in the Ecole Vétérinaire at Lyons that the metabolism, as gauged by the masseter muscle of the horse at rest and in full activity, was approximately as 1 during rest to 8 during activity. From these several data I have been led to think in octaves as follows:—

	KgM. per second.
1 Man-power at rest	10
,, in maximum activity	80
1 Horse-power at rest	80
,, in maximum activity	640

Obviously these are not given as final exact figures. The man-power figure of 10 KgM. per second is certainly too high. The scale of figures will, however, serve to illustrate the principle involved, and to indicate that it is necessary for purposes of clear thinking and of economical food distribution to replace the usual expression, "an average man doing an average day's work," by the more definite specification, "a man doing x KgM. per hour." We require a conventional value of "man-power" based upon experience and experiment analogous with the conventional value of "horse-power." Many years ago, when my attention was concentrated upon these matters, I gave the estimate as 115,000 to 144,000 KgM. for the eight hours of work of an ordinary labourer. (Waller: Human Physiology, third edition, 1896, p. 339.) This corresponds with a man-power = 4 to 5 KgM. per sec., and may probably be taken as a high rather than as a low estimate.

CENTRAL MIDWIVES BOARD.—A meeting of the Central Midwives Board was held at Queen Anne's Gate Buildings, Westminster, on April 18th, with Sir Francis H. Champneys in the chair. A letter was considered from the county medical officer of health for Somerset, transmitting copies of correspondence which had passed between himself and the General Medical Council with reference to the action of a registered medical practitioner in the county in giving a certificate to an uncertified woman certifying that she was "quite capable of undertaking the duties of an ordinary midwife," and asking the views of the Board thereon. The Board decided that the county medical officer for Somerset be informed that in the opinion of the Board the case is one in which representation should be made to the General Medical Council as to the action of the registered medical practitioner in the matter, and that the county medical officer of health be asked whether the Somerset County Council is prepared to prosecute the case before the General Medical Council.

WAR BREAD.

BY EDMUND I. SPRIGGS, M.D. LOND., F.R.C.P. LOND.,
SENIOR PHYSICIAN, DUFF HOUSE, BANFF; LATE SENIOR ASSISTANT PHYSICIAN TO ST. GEORGE'S HOSPITAL AND DEAN OF THE MEDICAL SCHOOL.

MUCH has been written about the alterations in the look and the taste of our daily bread which have taken place in the last three years. With better knowledge and practice in mixing flours and making bread there is an undoubted improvement in the loaf in those parts of the country from which most complaint came. There are still, however, many people who believe that war bread is bad for them, and a larger number who, whilst admitting that it may be good for healthy folk, think that it is unsuitable for the sick. It may, therefore, be of advantage to review afresh the composition of war bread at the present moment, to inquire what evidence there is of its digestibility in health and disease, and to consider what profit the nation gains by its use as compared with that of the pre-war wheaten loaf.

The war bread of to-day is made from flour which consists for the main part of wheat so ground as to yield 90 per cent. of the grain as flour. This means that some of the branny material of the outer part of the wheat grain, which was formerly separated and used for feeding animals, is now ground up fine and added, with the germ, to the flour. With this 90 per cent. wheat flour is mixed a variable proportion, usually less than one-fifth, of flour made from other cereals, chiefly barley, rice, and maize.

We may consider in what degree, if any, the digestibility of the bread is affected by the inclusion, first, of a part of the finely ground bran, and, secondly, of the flour of other cereals.

Effect of Including Larger Proportion of Grain.

A good deal of work has been done in the past upon the advantages or disadvantages of grinding into flour a larger or smaller proportion of the wheat grain,[1] the main result being that the differences in nutritive value of the flours so obtained are not great, not, indeed, so great as the differences between flours made from varying samples of wheat. Judging from earlier work, therefore, we should not be surprised to find that a 90 per cent. flour might contain as much nourishment as many samples of 70 per cent. or 80 per cent. flour.

Recently the Food (War) Committee of the Royal Society[2] has, in a well-conceived and wide research, compared the digestibility of 90 per cent. flour with that of 80 per cent. flour. Observations were made upon 4 persons in London, 4 in Cambridge, and 4 in Glasgow, the diet being regulated and the excreta analysed. The experiments were directed in the different centres by Mr. J. A. Gardner, Professor F. G. Hopkins, and Professor Noel Paton respectively, assisted by skilled workers. The results showed that the "90 per cent." bread was well digested, 94·5 per cent. of the nutritive matter of the whole diet being made use of by the body. With the "80 per cent." bread, 96·1 per cent. of the food consumed was absorbed. These figures are averages of all the experiments. There was, however, a striking agreement in the figures from each individual. The proportion of the nitrogen absorbed from the food was 87·3 per cent. with the 90 per cent. flour, against 89·4 per cent. with 80 per cent. flour.

This research shows that the addition to the flour of the extra 10 per cent. from the outer part of the grain had only a slight effect upon the digestibility of the diet, the absorption being within 1 or 2 per cent. of what it was with 80 per cent. flour. The subjects of the experiment were of varying physique, and they ate rather more bread than they were accustomed to take. When allowances are made for such alteration in diet it may be said that the only notable effect of the bread was an increase in the bulk of the motions. One subject, who said that brown bread had always disagreed with him, suffered from diarrhœa, and the experiment was discontinued. He recovered on bread made from Government regulation flour. This subject was the only one of the 12 who took beer, and the thought suggests itself that it would have been of interest to have gone on with the experiment and discontinued the beer.

These observations are in accordance with experience in Switzerland, where an 87 per cent. flour is now used. Professor E. Feer has recorded that the bread has produced no digestive disturbance in the children in a large hospital, and that when wholemeal flour was added to the milk of hand-fed children from the third month instead of white flour, no difference could be observed in the nutrition of the children or in their excreta.[3]

Effect of Addition of Other Cereals.

The dilution of wheat flour with other cereals would not be expected to have an adverse effect upon digestibility. There is none of the cereals which are available—namely, barley, rice, maize, and oats—which is not, or has not been, the staple food of whole nations.

Two experiments on the point have been published recently. The writer and Mr. A. B. Weir compared in a young man the digestibility of white bread and war bread with breads made from two-thirds white flour and one-third oats, barley, maize, or rice.[4] The subject took a fixed diet, each bread being eaten with it for three days at a time, and the excreta were demarcated and analysed. All these breads were found to be palatable and were as nourishing as bread made from white wheaten flour, 95 to 96 per cent. of the total nutriment being absorbed in each case.

In its newly published report the Royal Society Committee records observations on the digestibility of bread made from four parts of 80 per cent. wheat flour and one part of maize flour. The bread was eaten by 17 people, of whom 12 were also the subjects of the experiment with the 90 per cent. wheat flour. Of the five new subjects four were boys aged 8, 9, 12, and 13, and one was a man of 55 of poor digestion. At one centre the subjects did not find the maize bread so easy to eat as that to which they were accustomed, and some complained of flatulence. At another centre flatulence was not noticed, and one subject ate 2¼ lb. of the bread daily without discomfort. The analytical results of the observations were in no way dubious; they showed that the bread was as digestible as that made from wheaten flour.

In a further study under the direction of Mr. Gardner breads made from four parts of 90 per cent. wheat flour and one part of a mixture of barley, maize, and rice, also of barley and rice alone, were eaten by 47 munition workers for one or two months. The workers were weighed each week and their comments recorded. There was an average increase of weight. No flatulence or diarrhœa was complained of, and some of the workers who had suffered from constipation, and one who was liable to diarrhœa, were better while taking the bread.

We may therefore conclude from all these observations that the dilution of wheat flour with other cereals in the proportion hitherto used is in no way harmful. The use of potato in bread was not investigated in these experiments, but it may be assumed safely that such bread also is well digested. Indeed, much of it has been eaten with appreciation and without complaint.

Nature of Complaints.

The symptoms which are most commonly mentioned and attributed to war bread are a feeling of fullness, flatulence, looseness of the bowels, or constipation. It may be noted in the first place that a feeling of fullness and flatulence are the two commonest symptoms of indigestion of all kinds. They are likely to occur with any change of food, from dietetic errors unconnected with bread, from overwork or many other causes, and are not of consequence unless they persist. In view of the experimental data given above it appears that such symptoms cannot be ascribed to indigestibility of the ingredients from which war bread is made. If they arise from the bread at all they are more likely to be due to unskilful baking or insufficient chewing. War bread makes good toast, and for some types of weak digestion it is

[1] See J. M. Hamill: On the Nutritive Value of Bread made from Different Varieties of Wheat Flour, published by H.M. Stationery Office, 1911.

[2] Report on the Digestibility of Bread (3206).

[3] E. Feer: Ueber die Verwendung des Vollmehls in der Säuglingsernährung, und über das Vollbrot im Allgemeinen. Corresp. f. Schw. Aerzt., Dec. 29th, 1917. Quoted from THE LANCET, March 9th, 1918, p. 379.

[4] E. I. Spriggs and A. B. Weir: The Digestibility of Bread made from Two Parts of Wheat and One Part of Oats, Barley, Maize, or Rice. THE LANCET, Nov. 10th, 1917.

an advantage to toast it, as was, indeed, the case with pre-war bread. The second complaint made is of mild disturbance of the bowels, chiefly looseness, though some of the subjects of the experiments with maize bread complained of constipation. On the whole, war bread appears to be a little laxative as compared with pre-war bread. This is probably an advantage to the nation. Constipation is, unfortunately, too common on the modern diet of civilisation, and is in many people a source of ill-health.

The Royal Society's report gives some observations in which the same bread as was supplied to the canteen above referred to was eaten by 25 patients, including some advanced cases, observed by Dr. G. B. Dixon and Dr. E. G. Glover, in two sanatoria. Three of the patients disliked the bread and preferred ordinary bread, but in none was there evidence of digestive disturbance. War bread has also been eaten by patients with many forms of indigestion without any complaint being made that was not made with white bread. Experience shows that the number of those who complain of war bread includes a good proportion of nervous folk who would in any case be complaining of something. Indeed, Professor Feer says that in Switzerland only neurasthenics and hypochondriacs complain. We do not go so far as that, for we recognise at least two other classes of complainers. First, those already mentioned, who ascribe to a particular article of food symptoms due to other causes; and, secondly, those who do not like war bread and confound their likings with their needs. Members of our profession, when consulted by those in the last class, may justly call attention to the following facts.

Benefits from Use of War Bread.

Since a great part of our cereals comes from abroad the delivery of bread to each household involves the buying of corn abroad and its transport to this country. Such corn has to be paid for in money or in credit, and each payment lessens our wealth at a time when every penny is needed to help us in our struggle. But more than that, wheat brought across the sea involves at the present time a loss of ships and of our sailors' lives, owing to the frequent sinkings by submarines. The use of homegrown cereals to dilute wheat flour reduces these losses. A further reduction is made by grinding all the wheat to a 90 per cent. standard, for this alone, as the figures of the Royal Society's Committee show, gives a gain of 10 per cent. of nourishment, and even when allowance is made for the use of millers' "offal" to feed animals, there is still a gain of 9 per cent. of nourishment. That is to say by using war flour we save at least one pound in each 11 that are spent, one wheat-ship in each 11 sunk, and 1 life of each 11 that are sacrificed to give us our daily bread.

THE SERVICES.

ROYAL NAVAL MEDICAL SERVICE.

To be temporary Surgeons:—H. W. Archer-Hall, C. E. Cobb, W. A. Gray, N. B. de M. Greenstreet.

ROYAL NAVAL VOLUNTEER RESERVE.

A. C. Sleigh to be temporary Dental Surgeon.

ARMY MEDICAL SERVICE.

Lieut.-Col. E. B. Knox to be temporary Colonel whilst employed as Assistant Director of Medical Services of a Division.

J. H. Parsons to be temporary Colonel.

TERRITORIAL FORCE.

Col. C. P. Oliver to be retired, and is granted permission to retain his rank and wear the prescribed uniform.

Lieut.-Col. (temp. Col.) W. M. Roocroft relinquishes his commission on account of ill-health, and is granted the honorary rank of Colonel, with permission to wear the prescribed uniform.

ROYAL ARMY MEDICAL CORPS.

Majors relinquishing the acting rank of Lieutenant-Colonel on re-posting: W. Davis, A. W. Sampey.

To be acting Lieutenant-Colonels whilst in command of a Medical Unit: Capt. T. W. Browne, Capt. A. J. A. Menzies, Major R. F. Ellery, Capt. J. C. Sproule.

Major A. C. Osburn relinquishes the temporary rank of Lieutenant-Colonel on re-posting.

Capt. H. C. D. Rankin relinquishes the rank of acting Lieutenant-Colonel on re-posting.

Capt. T. W. Browne relinquishes the acting rank of Lieutenant-Colonel and reverts to the acting rank of Major, with pay and allowances of his substantive rank.

Temp. Major Henry S. Raper is seconded for service under the Ministry of Munitions.

To be acting Majors: Capts. E. Phillips, P. J. Ryan, C. H. Denyer, E. C. Lang, J. Rowe. Temp. Capts. A. C. Bryson, J. E. H. Roberts, R. B. Macfie, E. G. Stanley, H. C. Wilson, C. R. Macleod, C. A. Bernard, J. Watson, R. S. Rentor., J. W. McKinney, E. L. M. Hackett, H. G. Willis, C. F. Drew, E. C. Abraham, J. L. Menzies, A. R. Esler, J. S. Levis, D. McI. Hunter, W. K. A. Richards, F. C. Greig, H. B. Graham, C. J. Sullivan, B. F. Bartlett, B. W. Armstrong, P. J. Lane, J. H. Hebb, G. E. Spicer, A. Massey, W. J. Macdonald, F. T. Rees, G. W. Riddel, J. Burke, G. W. Parry, H. F. Warwick, J. H. Porter, W. R. P. McNeight, J. Crawford, J. W. Linnell, H. W. Powell, C. L. Chalk, C. C. Forsyth, W. S. Martin, E. E. Herga, G. E. Elkington, T. McCririck, W. R. Snodgrass, J. Rodger, W. A. Curry, J. W. Innes. Lieuts. (temp. Capts.) R. Ellis, H. E. A. Boldero, W. K. Campbell, W. C. Hargill, R. Stowers, J. A. Andrews.

Temp. Lieut. R. L. E. Downer to be temporary Captain.

F. C. Drew, late temporary Captain, is granted the honorary rank of Captain.

Temporary Honorary Lieutenants to be temporary Honorary Captains: R. M. Dodson, F. B. Grinnell.

Officers relinquishing their commissions: Temp. Capts. C. H. Denham, E. B. Morley, T. A. Jones, D. L. MacKenna (granted honorary rank of Captain), T. J. J. Curran, H. A. Cates, F. C. Macaulay, M.C., R. L. Thornley (granted honorary rank of Captain), P. Ashe; Temp. Lieuts. B. P. Hynes, S. Blake, W. L. Tindle, R. Young, L. du Vergé, J. H. Ashworth.

Canadian Army Medical Corps.

Temp. Capt. (acting Major) M. M. Crawford relinquishes the acting rank of Major on ceasing to be specially employed.

Temp. Lieut. J. A. Dickie is seconded for duty with the R.F.C.

Temporary Lieutenants to be temporary Captains: J. McW. McDonald, W. I. Henderson, C. A. Rae, J. E. Gimby, I. N. Mitchell, J. H. Macdonald, F. J. Elkerton.

SPECIAL RESERVE OF OFFICERS.

Captains to be acting Majors: F. Jefferson, W. A. Miller, J. M. Pirrie, R. A. Greenwood, J. C. Brash, G. A. Bridge, J. Rafter, S. J. Steward, R. H. Hodges, G. V. Stockdale, J. Purdie, W. R. Blore, R. P. Ballard, J. D. Proud, W. Barclay, W. B. Postlethwaite, W. H. Ferguson, G. P. Kidd, A. A. Smalley, C. F. Burton, C. J. Rogerson, J. P. Quinn, J. A. Pridham, C. E. H. Gater, R. Taylor, J. Stephenson, J. H. Bayley, G. H. C. Mold, F. G. Lescher, J. Swan, G. T. Van der Vijver, J. B. Cavenagh, A. J. Beveridge, P. J. Gaffiken, A. G. S. Wallace, E. J. Bradley, E. W. Williams, T. F. Hegerty, A. W. Russell, A. R. Hill, C. A. L. Shearwood.

To be Lieutenants: Second Lieut. W. L. M. Gabriel (from Unattached List, T.F.), J. Hope (from Manchester University Contingent, O.T.C.), F. Walton (from Leeds University Contingent, O.T.C.), D. M. Jones, A. Robertson.

TERRITORIAL FORCE.

Lieut.-Col. (Bt.-Col.) T. Gowans is restored to the establishment.

The undermentioned Captains to be acting Majors whilst specially employed: O. K. Wright, A. W. B. Loudon, E. N. Butler, D. G. Rice-Oxley, H. G. L. Haynes, P. T. Rutherford, R. P. Pollard, A. M. Hughes, J. M. Plews, F. Coleman, H. B. F. Dixon, M. T. Ascough, T. S. Elliot, C. B. Johnstone, T. E. A. Carr, H. P. Malcolm, J. H. Lloyd, J. W. Thomson, R. Henry, C. W. T. Baldwin, H. T. Bates, R. G. Dixon, S. Scott, C. P. Lapage, A. C. Hepburn, R. C. Clarke, R. V. C. Ash, N. W. Kidston, F. H. C. Watson, H. H. Robinson, N. M. Fergusson, J. H. Jordan, J. F. Edmiston, J. Strathearn, J. S. Wallace, J. W. Dale, E. M. Corner, J. S. McConnachie, J. M. Smith, J. H. Hunter, T. C. Britton, H. Seddon, S. McCausland, R. D. Moore, F. Wigglesworth, C. N. Smith, H. Foxton, G. E. St. C. Stockwell, W. B. Allen, V.C., W. Seddon, W. Scarisbrick, J. Morris.

Capt. (acting Lieut.-Colonel) A. C. Wallace reverts to the acting rank of Major on ceasing to command a Field Ambulance.

Capt. F. K. Milburn is restored to the establishment.

Capt. H. J. Walker vacates the appointment of Registrar.

Capt. W. R. Wood is transferred to the permanent personnel.

Capts. C. B. Whitehead and M. J. Mahony to be Majors.

J. H. Teacher (late Surg.-Capt., 1st Lanark R.H. Vols.) to be Medical Officer and temporary Lieutenant, 1st Battalion City of Glasgow Volunteer Regiment.

G. Pollock (late Capt., R.A.M.C.) to be Medical Officer and temporary Captain, 15th Battalion County of London Volunteer Regiment.

Temp. Capt. A. E. Clark relinquishes his commission in the Hampshire Medical Volunteer Corps.

Lieut. E. A. Gregg relinquishes his commision on account of ill-health.

JOURNAL OF THE ROYAL ARMY MEDICAL CORPS.

The March number of this journal contains a joint report to the Medical Research Committee by Captain W. Waddell, Captain C. Banks, with Mr. H. Watson and Mr. W. O. R. King (protozoologists), on the treatment of 102 carriers of *Entamœba histolytica* with emetine-bismuth iodide. This the authors found to be much more effective than emetine hydrochloride, although 20 to 25 per cent. of failures may occur. The drug had no appreciable effect upon the intestinal flagellates, but had an effect, usually temporary, on *E. coli*. In a paper by Captain W. H. McKinstry on Fuso-spirochætal Affections of the Mouth and Pharynx attention is drawn to the different varieties of fuso-spirochætal ulcerations of the gums, and the conclusion is reached that Vincent's angina and the allied ulcerations of the mouth cavity are always secondary to fuso-spirochætal ulceration of the gums. In notes on a series of cases of gunshot wounds during the campaign in East Africa, by Major E. L. Fyffe and Lieutenant C. E. L. Burman, the authors, among other conclusions, state that in all cases of rifle-bullet wounds, nervous phenomena should be looked for whether injury to a nerve is suspected or not. Mr. Rutherford Morison describes his technique in the treatment of infected, especially war, wounds. In the hope that D.A.H. may become less common in the British Army, Major T. J. Crean, V.C., and Captain B. H. Barton publish a study of 109 cases of trench fever, with special reference to the condition of the heart. Cases of the relapsing type, it would appear, are less liable to cardiac affection than those of the remittent type; the earlier a patient is put to bed the less likely is his heart to be affected; and cases treated with salicylate of soda are more liable to cardiac affection than others. Captain Alan W. Sichel describes a new test-type for the detection of malingerers in the Army who refuse to admit having as high a visual acuity as they really possess; and Lieutenant H. E. Rawlence contributes a case of hernia into the foramen of Winslow, operation being followed by recovery. Dr. R. T. Leiper's report on the results of the Bilharzia Mission in Egypt, 1915, is concluded.

THE BELGIAN DOCTORS' AND PHARMACISTS' RELIEF FUND.

SUBSCRIPTIONS TO THE SECOND APPEAL.

THE following subscriptions and donations to the Fund have been received during the week ending April 22nd:—

	£	s.	d.
Dr. T. G. Nasmyth ...	5	0	0
Dr. R. MacLelland ...	2	2	0
Dr. W. M. Cummins ...	1	1	0
Dr. Dora E. Allman ...	1	1	0
Dr. Wm. F. McKenna ...	1	1	0
Staff-Surgeon D. D. Turner, R.N.	2	2	0
Dr. F. S. Rhodes	1	1	0
Dr. Charles J. Evers ...	2	2	0
A. L. C.	5	0	0
Dr. J. H. W. Laing ...	1	1	0
Mr. Arthur Crook	2	2	0
Dr. George Rice	1	1	0
Dr. H. E. Huntly	1	1	0
Dr. Ina L. McNeill ...	2	2	0
Mr. Francis Lett	1	0	0
Dr. Albert E. Nicholls...	3	3	0
Dr. Philip Cloake	0	10	6
Dr. Josephine Coupland	0	10	0
Dr. W. M. D Gallie ...	1	1	0
Dr. Leonard Grant ...	1	1	0
Dr. E. P. Hasluck... ...	1	1	0
Dr. Wilfrid Glegg	1	1	0
Dr. J. Garrett...	0	10	6
Dr. B. H. Sweet	2	2	0
Dr. T. B. Haig ...	1	1	0
Dr. G. Vernon Bull ...	1	10	0
Dr. Mary E. Jeremy ...	0	10	0
Dr. J. W. Hayward ...	0	10	0
Dr. J. W. Killen	1	1	0
Dr. S. Williams	1	1	0
Dr. Dudley d'A. Wright	5	0	0
Dr. J. Spencer Hall ...	1	1	0
Capt. F. W. Joynes, R.A.M.C.	1	1	0
Dr. Arnold Scott	10	0	0
Dr. Fosbery	1	0	0
Mr. Miles A. Wood ...	0	10	6
Anonymous	6	0	0
Dr. J. Alfred Codd... ...	2	2	0
Dr. Eric Evans	6	0	0
Dr. E. L. Compston ...	1	0	0
Dr. Richard T. Smith ...	1	1	0
Dr. William Blair	1	0	0
Dr. Helen Boyle	1	1	0
Dr. Arthur de W. Snowden	5	0	0
Dr. Donald Macphail ...	1	1	0
Mrs. M. Scatchard... ...	1	1	0
Dr. G. H. Johnson ...	2	2	0
Dr. James H. Harrison...	1	1	0
Mr. Bennett May	1	1	0
Dr. Weldon C. Carter ...	0	10	6
Major J. Orton, R.A.M.C.	1	1	0
Dr. Robert Todd	1	1	0
Dr. Robert Jamieson ...	2	2	0
Dr. Colin Lindsey... ...	2	2	0
Mr. S. T. Irwin	2	2	0
Miss Phyllis Marriott ...	1	1	0
Dr. C. H. Greenwood ...	1	1	0
Dr. A. W. German... ...	2	2	0
Dr. Ernest Lewis Ward	1	1	0
Dr. G. J. Dudley	1	1	0
Dr. C. H. Cattle	1	0	0
Dr. E. B. Sherlock ...	2	2	0
Dr. R. W. Gentles... ...	1	1	0
Dr. R. B. Wild...	5	5	0
Dr. Rosa Dale	1	1	0
Dr. Mackenzie...	1	1	0
Dr. W. S. Hart...	3	0	0
Dr. R. Percy Jones ...	3	3	0
Dr. A. H. Nicoll	1	1	0
Miss Euphan M. Maxwell, F.R.C.S.I....	1	1	0
Dr. W. K. Law	2	0	0
Dr. A. F. G. Spinks ...	0	10	6
Dr. W. H. Lamb	2	2	0
Dr. J. C. Eve	2	2	0
Prof. J. M. Cleland ...	3	3	0
Dr. J. Rowland Payne...	0	10	6
Dr. H. M. Sylvester ...	1	1	0
Dr. Marion Stocks ...	1	1	0
Dr. E. M. Watkins... ...	1	1	0
Dr. A. Courtauld	2	2	0
Dr. George Pernet... ...	1	1	0
Dr. G. Fred Rogers ...	5	0	0
Dr. R. W. A. Bolan ...	2	2	0
Dr. J. Ferguson Weir ...	0	10	6
Dr. Howard S. Willson..	1	1	0
Dr. Henry Halliday ...	2	2	0
Dr. A. Pottinger Eldred	1	1	0
Dr. J. R. Bell	5	5	0
Dr. H. E. Quick	2	2	0
Dr. Charles D. Muspratt	1	1	0
Dr. John Playfair	2	2	0
Dr. J. H. Jacob (for 12 months)	6	0	0
Dr. Alex. Hendry	1	1	0
Dr. J. N. McGill	0	10	0
Dr. J. P. Fennell	1	1	0

Monthly Subscriptions (except where otherwise stated).

Dr. T. L. Drapes	0	10	0
Dr. J. O. Musson* ...	0	10	0
Dr. W. Stewart	0	10	0
Dr. G. Grey Turner ...	1	1	0
Dr. W. S. Hart	1	0	0
Dr. Vincent Tighe ...	0	10	0
Dr. Andrew Graham ...	1	1	0
Lieut. J. B. C. Brockwell, R.A.M.C. (per. m. for 6 m.)	0	10	0
Dr. J. H. Jacob (for 12 m.)	6	0	0
Dr. A. W. Forrest	1	0	0
Dr. Luffman	0	10	0

* For duration of war or until called up.

Subscriptions to the Fund should be sent to the treasurer of the Fund, Dr. H. A. Des Vœux, at 14, Buckingham Gate, London, S.W. 1, and should be made payable to the Belgian Doctors' and Pharmacists' Relief Fund, crossed Lloyds Bank, Limited.

ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW AND THE PROPOSED MINISTRY OF HEALTH.—Following the example of the Edinburgh Royal College, to which attention was called in THE LANCET of Jan. 5th, the Royal Faculty of Physicians and Surgeons of Glasgow have now considered the proposal to institute a Ministry of Health, and have accepted the principle of the creation of a Government Department, presided over by a Minister of Cabinet rank, to deal exclusively with matters pertaining to national health and to administer all existing health enactments. Further recommendations have been made as follow: 1. That the autonomy of the several parts of the United Kingdom shall be conserved by the formation of a board of health for each. 2. That each board shall contain persons representative of both the preventive and curative aspects of all departments of medicine and be competent to advise the Minister in regard to the adequacy of the public medical, nursing, and hospital services of the country. 3. That each board shall be aided by an advisory committee composed in part of members of the medical profession. The recommendations of the Royal Faculty conclude by appealing for ample time to consider such a measure as is contemplated before it is placed on the Statute Book.

Correspondence.

"Audi alteram partem."

BOTULISM.

To the Editor of THE LANCET.

SIR,—The articles by Dr. Wilfred Harris and Professor Arthur J. Hall on Botulism in THE LANCET of April 20th are, as you indicated in your annotation on the subject, of special interest at the present time. The clinical picture presented by the cases recorded in these articles appears closely to resemble that of the classic accounts given of this very rare disease.

Assuming that they are cases of true botulism and due to the ingestion of specifically infected food, it is of the first importance that the food at fault should be identified either by discovering the *B. botulinus* in portions of some of the material actually eaten by the patient, or by the method familiar to epidemiologists, of finding in a detailed and exhaustive food history of a group of cases some food material which is not only common to, but, in a certain degree, peculiar to them all.

In order that one or other of these methods of investigation may be applied at the earliest moment, while there is still a chance of obtaining a portion remaining over from any suspected food eaten and while the memory of the patient or his friends is still fresh as to the foods recently consumed, it would be desirable for medical practitioners to communicate at once with the medical officer of health of their district when any suspicious case comes under their observation.

I shall be glad if medical officers of health who may have had such cases brought to their notice will send me as full particulars, especially as regards food history, as they can obtain. I will arrange to have examined for them any samples of food materials which they may have good reason to suspect of having given rise to this illness.

I am, Sir, yours faithfully,

A. W. J. MACFADDEN.

Local Government Board, Whitehall, S.W. 1, April 23rd, 1918.

ACUTE INFECTIVE OPHTHALMOPLEGIA OR BOTULISM.

To the Editor of THE LANCET.

SIR,—The series of cases of this disease described by Captain Wilfred Harris in the current number of THE LANCET has thrown light on a case which has been puzzling me and causing me considerable anxiety. Briefly, the notes of the case are as follows:—

On April 2nd a gentleman living in Kensington came to me complaining that since rising that morning he had seen everything double, and he was in such a state of confusion thereby that he was obliged to bring someone with him to enable him to cross the streets. He stated that he had been feeling seedy for four or five days, was very constipated, and ascribed his symptoms to "liver." His temperature was normal, pupils slightly dilated, discs normal, tongue dry and furred. He was given a cathartic and told to report himself in two days if no better. He came again in two days, stating that he was much worse, and he was obviously in a very nervous state. He was sent home to bed, and next morning I made a careful examination. His mouth was very dry, tongue thickly furred, pupils dilated but reacting sluggishly to light; there was marked weakness in the external and internal movements of the eyes and a slight squint. The discs were normal; temperature 100·2° F.; pulse 96, soft and compressible; reflexes normal; Kernig and Babinski absent. He was very drowsy and dull, complaining chiefly of his diplopia and a fixed pain in the occipital region, more marked behind the ear on the left side. There was no tenderness over the scalp in this region.

During the following seven days his temperature oscillated between 100° and 101°, his pulse dropped to 84, and he had quiet talkative delirium at night, getting out of bed on several occasions. The squint became more pronounced, there was marked ptosis of the left eyelid, and the mouth remained dry and the occipital pain fairly severe. The constipation was overcome by means of calomel and salines.

The case puzzled me considerably. The patient had suffered from an attack of enteric only one year previously and a Widal reaction proved negative. A basal meningitis was naturally considered, but there was no tache cérébrale,

no stiffness of muscles, no pain in the back of the neck, and the discs were normal.

On April 13th his condition was much the same, but his chief complaint now was of intense weariness of all the muscles of his body, especially of his limbs. His temperature was 99° in the morning and 100° at night, his occipital pain diminished, and his diplopia had now disappeared, but the ptosis was still marked. He improved slowly and on the 16th was so much better that I foolishly allowed him to get up and transact some urgent business, which took him several hours. The result was that his temperature rose again slightly and the occipital pain became more marked. He was put to bed again and at present is slowly improving. The temperature is now again 99°, the pulse 76, and the occipital pain and diplopia have disappeared, but he complains of tremors and curious sensations in his arms, and nystagmus is still present. He is still very weak and the patellar reflex on the right side is exaggerated.

This case so closely resembles those described by Captain Harris and Major Arthur Hall that I think there can be no doubt that it is one of the same group. The patient states that he has never taken any tinned foods to the best of his knowledge, but he frequently takes meals at a restaurant. No examination of the cerebro-spinal fluid has been made. I am, Sir, yours faithfully,

LEONARD DOBSON, M.D. Lond.

Holland Park-avenue, W., April 21st, 1918.

TOXIC BULBAR PARALYSIS (POSSIBLY BOTULISM).

To the Editor of THE LANCET.

SIR,—Captain Wilfred Harris and Major Arthur Hall having called attention in THE LANCET of April 20th to several cases of toxic ophthalmoplegia, the following notes of a series of similar cases admitted into the Lambeth infirmary since March 24th may be of interest:—

1. E. B., female, 29. Admitted March 24th with a history of several days' malaise and headache. On admission coma, pyrexia, profuse sweating, severe asthenia, toxic erythema, dry brown tongue. K.J. present. No Kernig. C.-S. fluid under increased pressure but reduced Fehling's solution, and had only a slight excess of lymphocytes. Diarrhœa and signs of bulbar paralysis for three days before death, which occurred on April 7th. The temperature rose to 109° F. before death. Post-mortem: No signs of meningitis; the only naked-eye lesion in the C.N.S. were slight œdema and congestion of the floor of the fourth ventricle. Sections are being made (v.i.). All other organs were normal except for some injection of the mucous membrane of the intestine in the ileo-cæcal region.

2. E. B., female, 40. Admitted March 30th. Had had frontal headache and coryza for 14 days, anorexia for seven days; became semi-comatose four days before admission. On admission comatose, temperature 102° F., profuse sweating, K.J. diminished, pupils dilated and did not react to light, coarse tremor of the hands, profound asthenia, and dry brown tongue. Later constipation, toxic erythema, C.-S. fluid under increased pressure but reduced Fehling's solution, and contained only slight excess of lymphocytes. Dysphagia for four days before death, which occurred on April 20th. Post-mortem: Exactly the same findings as in Case 1.

3. E. T., female, 27. Admitted April 2nd. History of basal headache and sudden loss of consciousness. On admission comatose, photophobia, reflexes normal, temperature normal, C.-S. fluid normal. On April 5th toxic erythema, asthenia, and dry brown tongue. Recovery.

4. A. S., female, 61. Admitted April 2nd. History of sudden onset with occipital headache and nausea, followed by lassitude and mental apathy. On admission asthenia, double facial paresis (giving a mask-like expression), and double ptosis; no pyrexia; profuse sweating, constipation, and retention of urine. C.-S. fluid normal. Slight toxic erythema. Condition remains unchanged.

5. C. W., male, 38. Admitted on April 6th. History of pain in the "chest" and constipation for five days. On admission comatose, severe asthenia, temperature 103° F., profuse sweating, K.J. and abdominal reflexes present, double ptosis, and dry brown tongue. Later constipation and retention of urine. No rash. C.-S. fluid normal. Died April 10th. Post-mortem: Exactly the same findings as in Case 1.

6. C. P., female, 13. Admitted April 9th. History of a "cold" for a fortnight, vomiting at times and strange in manner for a week. On admission headache, dry brown tongue, profuse sweating, rigidity of neck, abdomen, and upper limbs. Later pupils dilated, react to light, coarse tremor of hands, irritative movements of the legs, constipation, dysphagia; K.J. present and plantar response extensor on both sides. C.-S. fluid reduced Fehling's solution, but slight excess of lymphocytes. Condition remains unchanged.

The admission of such a series of cases to the infirmary within three weeks suggested that these patients were suffering from an epidemic disease of obscure origin. It was found, however, that the patients came from widely separated districts—viz., No. 1 from Kennington, No. 2 from Stockwell, No. 3 from North Lambeth, No. 4 from Brighton, No. 5 from Southwark, and No. 6 from Kennington, none of the houses being near together. On April 7th a communication was made to the medical officer of health, who stated that he had not heard of any other similar cases in the district.

All the cases showed signs of toxic bulbar paralysis, and some of them had been regarded as cases of polio-encephalitis. In no case had the patient's illness been ascribed, either by patient or friends, to any food that had been taken, but the illness in each case resembles very closely the "botulismus" of the text-books and the cases described in the articles of Captain Harris and Major Hall, to which reference has been made. Pyrexia was present in some of the cases. Toxic erythema was intense in two of them. In each of the six the condition corresponds to the "meningitic type" described by Major Hall, the symptoms of bulbar paralysis and meningitic irritation predominating over the ophthalmoplegia.

In the fatal cases the length of the illness from the first symptoms to death varied from 10 days to 6 weeks.

Pathological investigations are not yet complete, but the following points that have already been ascertained may be noted. Sections of the medulla of Case 1 show marked infiltration with lymphocytes of the walls of the blood-vessels and almost general chromatolysis of the cells of the basal nuclei. In some of the cells the Nissl's granules seem to have been split up and to have been diffused throughout the body of the cell. Numerous cultures have been made, but only one, that from the floor of the fourth ventricle in Case 2, has given a spore-bearing organism on anaerobic cultivation; this organism is being investigated.

Clinically the cases did not at all resemble typhoid fever, but the Widal reaction gave the following results in two cases in which it was tried:—

	Date.	T.	Para. A.	Para. B.
Case 2.	3/4/18	1 in 20	Nil.	Nil.
	19/4/18	1 in 100 (partial).	Nil.	1 in 100 (partial).
Case 3.	9/4/18	Nil.	Nil.	Nil.
	16/4/18	1 in 50 (partial).	Nil.	1 in 20 (partial).

The above dilutions are the highest in which agglutination was obtained; in lower dilutions the agglutination was complete or almost complete.

From the case that has recovered we have obtained some blood serum which we intend to use therapeutically on some of the other cases.—We are, Sir, yours faithfully,

H. J. MCCAW, M.D., F.R.C.S.E.,
J. R. PERDRAU, M.B., B.S.,
G. F. STEBBING, M.B., B.S.,
Assistant Medical Officers, Lambeth Infirmary.

April 22nd, 1918.

TOXIC ENCEPHALITIS.

To the Editor of THE LANCET.

SIR,—The papers contributed to THE LANCET of April 20th by Dr. Wilfred Harris and Professor A. J. Hall must have roused general interest, and in some minds, like mine, must have focussed attention on obscure cases of disease recently observed and not labelled.

On April 1st of this year I saw in New Cross with Dr. Frost a man of 54 who had always enjoyed good health until about ten days before our consultation. He then appeared to be tired and out-of-sorts, but continued at his work of engine-driving. On March 25th he collapsed and developed symptoms of indigestion and vomiting. He complained of no pain, but became rapidly weaker in mind and body. On April 1st he lay in bed in a state of generalised rigidity, presenting every appearance of a case of advanced paralysis agitans, including the "mask-like" facies and the characteristic attitude of the limbs. He was so weak and rigid that he could not turn in bed, but he could carry out movements with every limb slowly and feebly. He was drowsy but sensible, although he had been somewhat delirious at night. His tongue was very brown and dry, his temperature about normal, and his pulse good. Respiration was not embarrassed. Examination of the nervous system revealed nothing abnormal in the cranial nerves or in the reflexes. He was removed next day to St. Thomas's Hospital, where he has been making a slow recovery in spite of obstinate constipation. The blood and cerebro-spinal fluid were examined with negative results.

This case resembles one described by Professor Hall, and there can be little doubt that it was caused by some poison acting chiefly on the mid-brain, thus producing the picture of Parkinson's disease. The cases described by Dr. Harris displayed symptoms of a toxic encephalitis involving the neighbouring oculo-motor nuclei, and it seems possible that there is a prevalent poison, whether the *Bacillus botulinus* or some other virus, which attacks the nervous system and produces different pictures, according to its incidence on this or that part of the brain, but with a special predilection for the brain-stem and mid-brain regions. In the case of Dr. Frost's patient the question of a food poison never presented itself to our minds, and I am unable to give any information on this point. I am, Sir, yours faithfully,

Wimpole-street, W., April 24th, 1918. E. FARQUHAR BUZZARD.

"TUBERCULOSIS IN DUBLIN."

To the Editor of THE LANCET.

SIR,—With some amusement and more indignation I have read the paragraph with the above heading in the letter from Ireland published in THE LANCET of April 20th (p. 582). Your correspondent cannot have known all the facts of the case or grasped the situation. In its capacity as sanitary authority for the county borough of the city the corporation of Dublin some years ago took over as "a going concern" the Charles-street Tuberculosis Dispensary, which had been founded shortly after the "Tuberculosis (Ireland) Act" became law in 1908, largely through the effort of the Marchioness of Aberdeen and Temair. The corporation, in accordance with the provision of Section 4 of that Act (8 Ed. VII., Chapter 56), duly appointed two medical superintendents having the qualifications prescribed by the Local Government Board for Ireland. Under the same Section the corporation also provided hospital accommodation for both early and advanced cases of pulmonary tuberculosis. In fact, a complete scheme for dealing with the "White Plague" within the county borough of Dublin was organised and approved by the supreme sanitary authority—the Irish Local Government Board. In 1911 the National Insurance Act (1 and 2 Geo. V., Chapter 55) was placed on the Statute Book. When its provisions, in its application to Ireland, took effect tuberculosis patients fell into two classes—insured and non-insured.

Up to a very short time ago both classes of tuberculosis patients were examined at the Corporation Tuberculosis Dispensary, Charles-street, Dublin. The medical superintendents treated them as extern patients or sent them to either of the corporation sanatoriums according as they were found to be in the early or the late stage of the disease respectively. Quite recently it seems that a difference sprang up between the Insurance Committee of the county borough of Dublin and the corporation of Dublin. This has led to the arrangement mentioned in your Irish correspondent's letter, in which he appears to approve the plan, for he writes: "It is generally hoped that the amount of tuberculosis, which is very prevalent in Dublin, will shortly be much reduced." Though I fervently join in that hope I cannot think that the best way of realising it is by creating a rival machinery for coping with the disease and causing delay in the distribution of the patients in suitable sanatoriums.

Here is a concrete example of the danger to the public health of the retrograde and, as I hold, unjustifiable step which has been taken by the Dublin Insurance Committee. On April 5th a lad of 17½ years was admitted to the Meath Hospital for an attack of erythema nodosum. He had a temperature without any evidence of rheumatism, and although he made no complaint of "chest trouble," cough and expectoration suggested the probability of a tuberculosis. This suspicion was confirmed by physical examination and by a bacteriological examination of the sputum, which examination was positive, Koch's bacillus being found on two separate occasions.

As the lad was in an ordinary male chronic ward, I called personally at the Corporation Tuberculosis Dispensary to have arrangements made for his early removal to a city sanatorium. The tuberculosis medical officer wrote to me under date April 19th, 1918, as follows:—

> "As requested by you yesterday, I called to see A. B., of —— street, a patient of yours suffering from pulmonary phthisis, at present in the west wing of the Meath Hospital. He is a suitable case for admission to Crooksling Sanatorium, and I should be very happy to make arrangements for his removal to that institution. Unfortunately, however, under new arrangements the Insurance Committee of the county borough of Dublin *do not recognise* the medical officers of the Corporation Tuberculosis Dispensary, and I am therefore powerless in the matter. The only thing I can do is to get into communication with the medical adviser of the Insurance Committee and ask him to make the necessary arrangements.
>
> You will understand that your patient is an 'insured person' under the National Health Insurance Acts. If he were non-insured the corporation would look after him."

This, then, is the upshot of the undertaking by the Insurance Committee of the duty of the corporation acting as sanitary authority of the county borough of Dublin: 1. Obstacles are thrown in the way of an insured tuberculosis patient receiving sanatorium treatment at the earliest moment. He is practically worse off than if he was not insured at all. 2. A second and costly machinery for dealing with tuberculosis is called into existence by a body which is not a sanitary authority, and therefore not in a position to carry out disinfection and other duties of a preventive nature. 3. The funds of the Insurance Committee, which are none too large, are charged with defraying the cost of a new and duplicated machinery, which is quite unnecessary. I admit, of course, that what has been done is not absolutely outside the province or powers of the Insurance Committee under the terms of Section 64, Subsection 4, of the National Insurance Act, 1911. But the Insurance Committee had already made an agreement with the corporation in accordance with that Subsection, and one would like to know why that agreement has been determined.

So strongly did I feel on the contretemps which befell my unfortunate insured patient, who is innocently a source of danger to the other patients under treatment in the ward in which he is detained by "red tape," that I called at the offices of the Local Government Board to see whether anything could be done to stop such a dangerous state of things. But that body proves to be powerless in the matter, having no control over the Insurance Committee or over the National Health Commission for Ireland.

What a strong argument is here for the establishment of a Ministry of Health, which would exercise a supreme control over the various organisations which have to do with the weal of the community.

I am, Sir, yours faithfully,

JOHN W. MOORE, M.D., D.P.H., F.R.C.P.I

Dublin, April 20th, 1918.

THE PREVENTION OF MEASLES MORTALITY.

To the Editor of THE LANCET.

SIR,—In your issue of April 13th you bring forward a point in your leading article on the prevention of measles mortality which, I think, has not been sufficiently emphasised. In the various suggestions for the prevention of mortality in measles the utility in after-life of having passed through an attack of measles in childhood is rarely mentioned. I have been struck by the severity of the disease in adults, especially among the soldiers who have come from remote parts of the country or from the colonies, and I cannot help thinking that the immunity of soldiers from London and other large cities in England has proved extremely useful. To my mind all our efforts ought to be directed to the *prevention of mortality* as against the *prevention of the spread* of the disease. I admit that postponement of an attack till after the fourth or fifth year of life is desirable, but there is a great deal to be said for the view that children between 5 and 10 years need not be the objects of too much care while at school, otherwise they are sure to get an attack at some other inconvenient period.

A medical friend of mine bought a practice in London and had only been in it a few months when he took an attack of scarlet fever, and he expressed the opinion to me that he wished his mother had not been so careful with him as a child, for the attack very nearly ruined him. I think the same might also be said about many attacks of measles in adults. I am, Sir, yours faithfully,

R. KING BROWN, M.D.,
Medical Officer of Health.

Public Health Department, Bermondsey, S.E., April 22nd, 1918.

THE TREATMENT OF ACUTE GAS CASES.

To the Editor of THE LANCET.

SIR,—A method which I introduced at the Prince of Wales's Hospital for Officers (Great Central Hotel, Marylebone) last summer of steam-spraying the air-passages with Dobell's solution I have now supplemented, when necessary, by using a *fine* oily nebula with cocaine, 2 gr. ad ℥i., such as is given by the aeriser of Messrs. Oppenheimer with their No. 9 neboline compound. This is used after the mucous membrane of the bronchi has been washed by the spray of Dobell's solution or after coughing, and seems to afford relief. The addition of 1 per cent. cocaine and 1 in 10,000 adrenalin to a 2½ per cent. solution of boracic acid also affords great relief to the eye conditions as a "drop," a temporary measure which may be repeated.

I am, Sir, yours faithfully,

THOMAS D. LISTER,
Consulting Physician for Lung Cases to the Prince of Wales's Hospital.

April 23rd, 1918.

ETHER CLONUS.

To the Editor of THE LANCET.

SIR,—In the issue of THE LANCET of April 13th Dr. Henri Vignes gives some information on the condition known as "ether clonus" or "ether rigor." My own observations have been somewhat similar to those of Dr. Vignes. I have seen clonus occur with ether given by the open, semi-open, or closed methods, and also in C.E. (1 : 2), but never any clonus or rigors during the administration of pure chloroform. The greatest frequency occurs with ether given by the open and semi-open methods, and least of all in C.E. administrations.

The condition, as far as my own experience is concerned, is confined to men. I have never had or seen a case in a woman or child. I have also noticed that it is much more common in military patients than in men employed in civil life in any capacity. It may be possible, as Dr. W. D. Anderson suggests in THE LANCET of Dec. 22nd, 1917, p. 949, that this is a consequence of the nervous state due to modern war conditions. In civil practice the condition appears to be confined to the limbs, as I have never seen it present in operations on the head, chest, or abdomen. This fact might explain why ether clonus appears more common in soldiers, because a considerable amount of military surgery is composed of work on the extremities. It is quite common to see a rigor or clonus started when a patient, who is anæsthetised, is moved on the table for some reason or other, although before he was perfectly quiet.

The pathology of this troublesome condition is wrapped in mystery. No theory appears to be entirely satisfactory. I was always taught that the patient was not fully anæsthetised, but I am convinced that this is wrong, because my own patients presented all the signs of a normal anæsthesia except for the clonus. My own theory is that it is due either to asphyxia, set up by lack of air and the narrowing of the air-passage by congestion due to the ether vapour, or a condition something akin to the clonic movements seen in the administration of nitrous oxide alone. This theory may appear on the face of it ridiculous, when thinking of the administration of ether by the open method, but I must say that I have seen patients "soaked" to asphyxia by this method, because when the gauze gets sodden there is very little air passing through the meshes, whereas in closed ether the rule is to give air at regulated intervals.

I have never known the clonus persist all through the operation except in one case of gunshot wound of the right side of the head, when the left leg was in a state of clonus before, during, and after the operation. The treatment is very unsatisfactory, but unless the condition persists all through the operation, it is often relieved by increasing the amount of air, or by changing from ether to pure chloroform if the case permits.—I am, Sir, yours faithfully,

J. B. H. HOLROYD,
Lieut., R.A.M.C.; Anæsthetist, Queen Mary's Military Hospital, Whalley, and Sheffield Royal Hospital.

April 20th.

THE PARLIAMENTARY REPRESENTATION OF THE COMBINED UNIVERSITIES.

To the Editor of THE LANCET.

SIR,—In your issue of April 20th Dr. E. Rowland Fothergill takes exception to the formation of a political association in connexion with the combined English Universities, though at the same time he somewhat inconsistently suggests that those who think like him should take action to support a candidate who would hold views similar to him. We would point out that party politics consist fundamentally of the coöperation for political purposes of those who hold the same political views, and those who hold Conservative and Unionist views have as much right to coöperate in a University constituency as a group of people who hold any other opinions in common.

His letter is inaccurate in certain particulars, and we would point out that he was informed some weeks ago, in reply to a post-card from him, exactly how our committee came to be appointed. It is not self-constituted, but was elected at a meeting to which we invited all the graduates resident in London of the seven Universities whose names and addresses could be found. It is true that the attendance at the meeting was small, but everything must have a beginning. In addition, however, to those who had accepted the invitation, a very much larger number had written expressing approval of the proposal to form an association.

Dr. Fothergill suggests that we are endeavouring to secure the election of a candidate who holds our views; this, of course, is the main object of our association, just as it would be the main object of the association which he suggests should be formed, but as there are to be two members to the division and not one, and as the election will be in accordance with the principle of proportional representation, it is obvious that our association, however successful it might be, could not hope to monopolise the representation of the division. Dr. Fothergill indulges in the gratuitous assumption that our candidate will not be keen on social questions. He may be assured that the undersigned, at any rate, will not support a candidate who is not desirous of improving the condition of the masses of the people in this country, though, at the same time, we would point out to him that many of the proposals which are described as "social reforms" merely aggravate the disease which they profess to cure. In any event, we think it a *sine qua non* that the members for the division should be graduates of one or more of the seven Universities concerned, as only in that way can suitable representation be secured. He suggests that the University authorities should wake up in the matter in view of our activities, and, while we appreciate the implied compliment, we would point out, if by the University authorities he means the respective Senates, that it would be wholly improper for these official bodies to take any collective action, even if the bulk of the members thereof were electors in the division, but when, as a matter of fact, the majority of the members of these bodies are graduates of other Universities—e.g., Oxford, Cambridge, London, and Edinburgh—and therefore not electors in the division, it is even more obvious that they should not take any part in the matter.

In conclusion, we would state that our association, in addition to its purely political objects, also intends to interest itself in the advancement of education and the extension of human knowledge, and the best justification for our action is the fact that already communications expressing approval have been received from graduates who are in number more than twice as many as the aggregate membership of the Senates of the seven Universities.

We are, Sir, yours faithfully,
W. M. ABBOT ANDERSON, Chairman.
HERBERT G. WILLIAMS, Hon. Sec.,
Combined Universities Conservative and Unionist Association.

April 23rd, 1918.

ARTIFICIAL FROST-BITE.

To the Editor of THE LANCET.

SIR,—Your correspondent, Mr. Leighton Kesteven, would appear to suggest that the effect produced by ethyl chloride is rather one of "chilling" of the tissues than of actual "frost-bite," despite the fact that this substance carries the tissues down to below −6° C. which I maintain to be a critical temperature. This conclusion he bases on the fact that although considerable swelling is produced by the exudation there is nevertheless no direct necrosis of tissue.

I believe the explanation of this paradox to be as follows. The effect of ethyl chloride is a very superficial one, and as usually used the period of extreme exposure is but momentary; under these circumstances it is only the outermost layers of the epidermis—i.e., the partially keratinised layers, which are actually at a temperature below −6° C. The deeper, live layers of the epidermis being at varying temperatures above this critical limit, no direct necrosis is to be expected, and the swelling which follows is due to the effect of "chilling" on the underlying tissues, being therefore strictly analogous to "trench foot." If the exposure to ethyl chloride be prolonged, however, the thin parchment-like plaque of solidified tissue, which first forms, will be found to increase in thickness until it includes the whole of the dermis; direct death of the cells of the Malpighian layer now occurs and necrosis follows, not of necessity leading to ulceration but to eventual desquamation, thinning of epithelium, and fine scarring.

Exudation occurs both in "chilling" and true "frost-bite," and any additional destruction due to this may be prevented by multiple incisions, &c., as your correspondent suggests. I have tried this experimentally and found it to be efficient. The value of freezing as a local anæsthetic has probably been overestimated, and in view of the above considerations with regard to its after-effects it should be used with considerable reserve.—I am, Sir, yours faithfully,

Harley-street, W., April 17th, 1918. NORMAN C. LAKE.

The War.

THE CASUALTY LIST.

THE following medical officers appear among the casualties announced since our last issue:—

Killed.

Capt. A. L. Gardner, R.A.M.C., was a student at Guy's Hospital, London, and qualified in 1912. He held an appointment at the Poplar and Stepney Sick Asylum, London, and prior to joining up was in practice at Ilfracombe, where he was one of the medical officers of the Tyrrell Cottage Hospital.

Lieut.-Col. H. Stewart, D.S.O., M.C., R.A.M.C., qualified at Dublin in 1904, and joined the R.A.M.C. shortly afterwards. At the time of his death he was in command of a field ambulance. The award of the D.S.O. was recorded in THE LANCET of June 9th, 1917, p. 894.

Lieut. R. Harris, New Zealand M.C.

Capt. L. A. H. Bulkeley, R.A.M.C., qualified at Durham in 1904, and held appointments at the Royal Infirmary, Newcastle-on-Tyne, and at the Darlington Hospital and Dispensary. Prior to joining the R.A.M.C. he was in practice at Gateshead-on-Tyne.

Previously reported Missing, now reported Killed.

Capt. S. Cross, R.A.M.C., attached Suffolk Regiment, received his medical education at Durham University and qualified in 1899. After holding an appointment at the Brighton and Sussex County Throat and Ear Hospital, he practised at Newcastle-on-Tyne, where he was assistant surgeon to the Throat and Ear Hospital and Hospital for Women and anæsthetist to the Dental Hospital. He joined the R.A.M.C. in 1915.

Died.

Col. T. W. O'H. Hamilton, C.M.G., R.A.M.C., received his medical education at Trinity College, Dublin, and qualified in 1881. Early in his professional career he joined the Army Medical Service and took part in the South African War, being present at the relief of Kimberley. He was awarded the C.M.G. and the Queen's medal with six clasps and the King's medal with two clasps. He died at Colchester.

Wounded.

Capt. E. E. Isaac, M.C., R.A.M.C., attached Royal Fusiliers.
Major C. B. Davies, M.C., R.A.M.C.
Capt. H. F. H. Eberts, R.A.M.C.
Capt. C. Jacobs, M.C., R.A.M.C., attached Lincs. Regiment.
Capt. A. Merrin, R.A.M.C.
Capt. B. J. Mullin, M.C., R.A.M.C., attached R.F.A.
Capt. A. W. Berry, R.A.M.C.
Capt. P. A. Creux, R.A.M.C.
Lieut. A. H. Southam, R.A.M.C.
Capt. W. H. N. White, R.A.M.C.
Capt. T. G. Allen, Australian A.M.C.
Major R. F. Craig, Australian A.M.C.
Lieut. G. N. Groves, R.A.M.C.
Capt. R. Kenefick, R.A.M.C., attached Dragoon Guards.
Capt. G. L. Pillans, M.C., R.A.M.C., attd. Seaforth High.
Capt. J. A. Tomb, R.A.M.C., attached Manchester Regt.
Capt. R. Baxter, M.C., New Zealand M.C.
Capt. D. Dempster, R.A.M.C., attached Black Watch.
Capt. S. P. Hodkinson, R.A.M.C., attached R.G.A.
Capt. A. G. Cook, R.A.M.C.
Major C. B. Davies, M.C., R.A.M.C.
Capt. F. P. Freeman, M.C., R.A.M.C., attached Essex Regt.
Capt. C. H. Harbinson, R.A.M.C., attached R.F.A.

Missing, believed Wounded.

Capt. E. E. Mather, R.A.M.C., attd. Durham Light Infantry.

Previously reported Missing, now reported Not Missing.

Capt. E. J. Storer, R.A.M.C.

Missing.

Capt. J. B. Ball, R.A.M.C., attached West Yorks Regiment.
Capt. A. C. Bateman, M.C., R.A.M.C., attd. Cameron High.
Capt. A. J. Chillingworth, R.A.M.C., attd. R.W. Kent Regt.
Capt. S. J. Darke, M.C., R.A.M.C., attd. R.W. Surrey Regt.
Capt. R. R. Duncan, R.A.M.C.
Capt. J. P. Thierens, R.A.M.C., attached Leicester Regt.
Capt. J. G. Anderson, R.A.M.C., attached Black Watch.
Capt. H. B. Jones, R.A.M.C., attached Bedford Regiment.
Capt. W. H. R. McCarter, R.A.M.C., attd. Leicester Regt.
Capt. R. A. Leembruggen, R.A.M.C., attached Suffolk Regt.
Capt. J. Tate, R.A.M.C., attached E. Lancs. Regt.
Capt. J. M. Evatt, R.A.M.C., attached R.F.A.
Capt. I. C. MacLean, D.S.O., M.C., R.A.M.C., attached Rifle Brigade.
Capt. D. F. Torrens, R.A.M.C.
Surg. H. C. Broadhurst, R.N.
Capt. G. L. Jones, R.A.M.C., attached Scottish Rifles.
Capt. F. P. Smith, R.A.M.C.

Prisoners in German Hands.

Capt. T. W. Leighton, R.A.M.C., attached Manch. Regt.
Capt. W. O'Brien, R.A.M.C., attached Lancs. Fusiliers.
Capt. D. M. Spring, R.A.M.C.

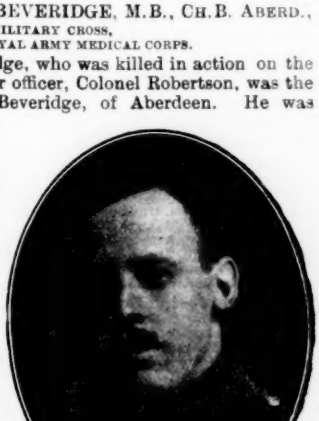
OBITUARY OF THE WAR.

JAMES ROBERTSON, M.D., CH.M. ABERD.,
LIEUTENANT-COLONEL, ROYAL ARMY MEDICAL CORPS.

Lieutenant-Colonel J. Robertson, who was killed in action on March 21st at the age of 37 years, was son of the late John Robertson, of Aberdeen, and educated at the University in that city. He graduated M.B., Ch.B. in 1904, and after holding a house appointment at the Infirmary he travelled in South America and India before returning to Aberdeen, where he became senior assistant anæsthetist to the Infirmary. He attained academic distinction, taking the highest diplomas in both medicine and surgery, the latter with honours, and a thesis on the newer methods of diagnosis in urinary disease. A clinical assistantship at St. Mark's Hospital, London, and attendance at clinics in Dublin, Hamburg, and Berlin, had given him an all-round knowledge of the subject. Dr. Robertson was already a captain in the R.A.M.C. (T.F.) at the outbreak of the war and took a leading part in raising a second company of the corps to which he was attached. Early this year he was mentioned in despatches from France, and he met his death during performance of his duties in the field. Colonel Robertson married the only daughter of the late Rev. John Catto, of Fintray.

BERNARD GORDON BEVERIDGE, M.B., CH.B. ABERD.,
MILITARY CROSS,
CAPTAIN, ROYAL ARMY MEDICAL CORPS.

Captain B. G. Beveridge, who was killed in action on the same day as his superior officer, Colonel Robertson, was the son of Dr. A. T. G. Beveridge, of Aberdeen. He was educated at Gordon's College and at Aberdeen University, graduating M.B., Ch.B. in 1912, when he joined his father in general practice. In December, 1914, he was given a commission in the R.A.M.C., and for nearly three and a half years was on active service in France with hardly a break. In charge of a divisional collecting-post he was recently awarded the Military Cross for organising and carrying out the evacuation of wounded over the open under continuous fire. Captain Beveridge is described as a man of gentle disposition, which endeared him to his patients whether at home or on the field of battle. He married in 1915 a daughter of Thomas Buffey, Mus. Doc.



EDWARD CHARLES CUNNINGTON, M.R.C.S. ENG.,

CAPTAIN, ROYAL ARMY MEDICAL CORPS.

Captain E. C. Cunnington, who was killed in action on March 23rd at the age of 27 years, was only child of Captain B. Howard Cunnington, J.P., of Devizes. He was educated at Reading College and Corpus Christi College, Cambridge, going on to St. Bartholomew's Hospital, London, where he qualified in 1915, subsequently filling the post of house physician. Obtaining a commission in the R.A.M.C., he was first sent out to Egypt attached to a field ambulance, and on his return was appointed medical officer to the 12th York and Lancashire Regiment, with whom he served for two years in France. He returned to his original unit a few days before his death, which was due to the bursting of a shell in his advanced dressing station whilst he was attending to the wounded. In conformity with the family tradition Captain Cunnington was a keen archæologist, finding in his studies of prehistoric relics a welcome relaxation from his medical duties in the trenches. He was a fellow of the Cambrian Archæological Society and took part in its annual meetings.

CASUALTIES AMONG THE SONS OF MEDICAL MEN.

The following additional casualties among the sons of medical men are reported:—

Lieut. A. W. B. Danne, Gloucester Regiment, killed in action, elder son of Dr. W. Danne, of Bristol.

Second Lieut. J. N. Smith, Cheshire Regiment, killed in action, youngest son of the late Mr. Noble Smith, of Queen Anne-street, London.

Lieut. J. G. Antill-Pockley, Australian Infantry, killed in action, youngest son of Dr. F. Antill-Pockley, of Sydney, N.S.W.

S. M. Grigson, Australian Flying Corps, died at the Central Military Hospital, Aylesbury, younger son of Dr. R. E. Grigson, of Sydney, N.S.W.

Second Lieut. R. E. Hamilton, Devonshire Regiment, killed in action, younger son of Dr. A. Hamilton, of Manea, Cambridge.

Capt. G. A. Murray, M.C., R.F.A., died of wounds, son of Lieut.-Col. C. F. K. Murray, M.D., President of the Medical Council of South Africa.

Capt. J. A. Tuzo, Royal Sussex Regiment, died in East Africa, only son of the late Dr. H. A. Tuzo.

Second Lieut. E. A. Reid, Hampshire Regiment, killed in action, only son of Dr. G. A. Reid, F.R.S.E., of Southsea.

Lieut.-Col. P. N. Kent, Dragoon Guards, died at a base hospital of appendicitis, son of the late Dr. J. G. Kent, of Kingston-on-Thames, Surrey.

Second Lieut. T. A. Cropper, R.F.A., died of wounds, only son of the late Capt. J. Cropper, R.A.M.C.

THE HONOURS LIST.

The following awards to medical officers are announced:—

Distinguished Service Cross.

Surg. (acting Staff Surg.) Armin Gascoigne Vavasour Elder, R.N.V.R.

In recognition of his services in connexion with Naval ambulance trains and sea hospital transport throughout the war. Actg. Staff-Surgeon Elder was frequently under fire at the Gallipoli beaches.

The Military Cross.

Temp. Capt. Cecil Francis Dillon-Kelly, R.A.M.C.

For conspicuous gallantry and devotion to duty. Establishing his regimental aid-post in the captured enemy line, he himself kept in touch with the advanced troops and dressed the wounded under heavy machine-gun and rifle fire. He remained in the most advanced positions dressing the wounded until every case had been evacuated, and showed an excellent example of disregard for danger and courageous determination.

Capt. Arthur Joseph Gordon Hunter, R.A.M.C.

For conspicuous gallantry and devotion to duty. His battalion being engaged on both sides of the river at points a considerable distance apart, he repeatedly went out in the face of heavy machine-gun and rifle fire to organise the collection and evacuation of the wounded. His gallant behaviour and magnificent coolness inspired the men working under him with the utmost confidence.

Capt. Louis Laurence McKeever, R.A.M.C.

For conspicuous gallantry and devotion to duty during an engagement. Hearing that there was no medical officer in the front line, he went forward at once under an intense bombardment and remained in the front line all night attending to the wounded under continuous and violent shell-fire. He set a splendid example of courage and devotion to duty.

FOREIGN DECORATIONS.

French.

Légion d'Honneur.—Croix d'Officier: Col. (temp. Surg.-Gen.) G. L. Foster, C.B., D.M.S., Canadian Forces.—*Croix de Chevalier:* Col. G. S. Beauchamp, Canadian A.M.C.; Col. W. W. O. Beveridge, C.B., D.S.O., A.M.S.

Croix de Guerre.—Temp. Capt. E. G. Stanley, R.A.M.C.; Col. T. Du B. Whaite, C.M.G., A.M.S.; Temp. Capt. G. T. Cregan, R.A.M.C.; Capt. J. F. Edmiston, R.A.M.C.; Capt. J. H. P. Fraser, R.A.M.C.; Capt. S. R. Gibbs, R.A.M.C.; Temp. Lieut. R. J. Hebsby, R.A.M.C.

Belgian.

Ordre de Léopold: Chevalier.—Capt. R. G. Martyn, R.A.M.C. (Spec. Res.).

Croix de Guerre.—Capt. R. G. Martyn, R.A.M.C. (Spec. Res.).

MENTIONED IN DESPATCHES.

In a despatch forwarded by the Government of India, and dealing with the operations against the Mahsuds, March–August, 1917, the following reference to the Medical Services appears:—

The Medical Services, under the direction of Colonel P. Hehir, C.B., C.M.G., I.M.S., by the timely use of precautionary measures, were able to prevent the outbreak of epidemics, and the arrangements made for the reception and evacuation of the large numbers of sick, which it was anticipated would have to be dealt with as a result of the great heat and unhealthy theatre in which the operations took place, were fully adequate to deal with the casualties which occurred. The provision and equipment of base hospitals and convalescent depots at Rawalpindi and in the Murree Hills was quickly carried out under the orders of the General Officer Commanding 2nd (Rawalpindi) Division, and amply sufficed to meet all requirements.

FOURTH-YEAR STUDENTS FOR THE ARMY.—Owing to the urgent need of the Army the Court of St. Andrews University has decided that male medical students in their fourth year shall be asked to volunteer for service; and in order to hasten the qualification of students now in their final year, the examinations for medical degrees formerly held in the middle of June will be held a month earlier.

Fulham Palace has been placed at the disposal of the British Red Cross Society, and it will be opened shortly as a branch of the Freemasons' War Hospital. Accommodation is provided for 100 patients, who will be received irrespective of membership of the Masonic craft. Sir Horace Marshall is the treasurer.

URBAN VITAL STATISTICS.

(Week ended April 20th, 1918.)

English and Welsh Towns.—In the 96 English and Welsh towns, with an aggregate civil population estimated at 16,500,000 persons, the annual rate of mortality was 15·4, against 16·6 and 16·1 per 1000 in the two preceding weeks. In London, with a population exceeding 4,000,000 persons, the death-rate was 16·1, or 1·2 per 1000 below that recorded in the previous week; among the remaining towns the rates ranged from 3·0 in Swindon, 3·8 in Hornsey, and 7·6 in Northampton, to 22·4 in Darlington, 26·9 in West Hartlepool, and 27·2 in Bury. The principal epidemic diseases caused 538 deaths, which corresponded to an annual rate of 1·7 per 1000, and included 241 from measles, 208 from whooping-cough, 40 from diphtheria, 36 from infantile diarrhœa, 8 from scarlet fever, and 5 from enteric fever. Measles caused a death-rate of 2·8 in Merthyr Tydfil, 2·9 in Oxford, 3·4 in Hull, 4·1 in Rhondda, 4·2 in West Hartlepool, and 5·4 in Barnsley; whooping-cough of 1·7 in Willesden, 1·8 in Walsall, and 2·5 in West Hartlepool; and diphtheria of 1·7 in St. Helens. The 906 cases of scarlet fever and 1400 of diphtheria under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital were 34 and 31 below the respective numbers remaining at the end of the previous week; there were also 21 cases of small-pox remaining, including 2 new cases admitted during the week. Of the total deaths in the 96 towns, 147 resulted from violence. The causes of 40 deaths were uncertified, of which 9 were registered in Birmingham, 5 in South Shields, and 4 each in Liverpool and Sunderland, but not one in London.

Scotch Towns.—In the 16 largest Scotch towns, with an aggregate population estimated at nearly 2,500,000 persons, the annual rate of mortality was 13·7 per 1000, and coincided with that recorded in the previous week. The 302 deaths in Glasgow corresponded to an annual rate of 14·1 per 1000, and included 17 from measles, 7 from whooping-cough, 6 from infantile diarrhœa, and 2 from diphtheria. The 80 deaths in Edinburgh were equal to a rate of 12·5 per 1000, and included a fatal case of diphtheria.

Irish Towns.—The 171 deaths in Dublin corresponded to an annual rate of 22·3, or 1·7 per 1000 below that in the previous week, and included 11 from whooping-cough, and 6 each from measles and infantile diarrhœa. The 189 deaths in Belfast were equal to a rate of 25·1 per 1000, and included 16 from whooping-cough, 2 from measles, and 1 each from enteric fever and infantile diarrhœa.

MEDICO-PSYCHOLOGICAL ASSOCIATION.—The spring meeting of the Northern and Midland Division was held at the County Asylum, Rainhill, Lancashire, on April 18th, Lieutenant-Colonel E. White presiding. Major R. Eager, R.A.M.C., gave a statistical summary of the first 12 months' admissions to the mental section of the Lord Derby War Hospital, with illustrations of typical cases. Dr. G. A. Watson, pathologist to the asylum, read a paper by Dr. T. P. Cowen and himself on Pellagra, with particular reference to cases that had occurred at Rainhill, and showing on the screen the pathological changes in the cerebral cortex. A demonstration was given by Dr. Watson in the laboratory and museum.

Obituary.

WILLIAM MILLER CROWFOOT, M.B. LOND., F.R.C.S. ENG.,

HONORARY CONSULTING SURGEON TO BECCLES HOSPITAL.

WITH the death of Dr. William Miller Crowfoot on April 6th, in his eighty-first year, there has passed away one of the most respected members of the East Anglia community, while the medical profession suffers a distinct loss in one who represented the country general practitioner in a notably distinguished manner. William Miller Crowfoot was the grandson of the late Mr. Henchman Crowfoot, and elder son of the late Mr. William Edward Crowfoot, both of whom were members of the medical profession. He was educated at Fauconberge School, Beccles, and later at Basle in Switzerland, afterwards studying medicine at St. Bartholomew's Hospital, where he passed a brilliant studentship, winning exhibitions and scholarships with ease. In 1857 he gained the University of London gold medal for anatomy and physiology, and in 1859 the gold medal in comparative anatomy, physiology, and surgery, carrying with it an exhibition, and the gold medal in midwifery. In the same year he graduated M.B. of London University, having taken the M.R.C.S. and L.S.A. in the previous year. Immediately after graduating he was offered an appointment at St. Bartholomew's Hospital, but decided to enter into practice with his father at Beccles, and to continue the family tradition into the third generation. As a medical practitioner he gained the affection and confidence of the large circle of patients to whose care he succeeded, a circle which his work and his reputation alike extended. Always keeping himself abreast of medical knowledge and procedure, his opinions were received with marked attention by his colleagues, and his wide experience was always at the disposal of his younger brethren. In 1890 he was elected F.R.C.S. Eng. *hon. causâ*.

Apart from the cares of his profession, Dr. Crowfoot was an enthusiastic naturalist, botanist, and archæologist. He was also an early supporter of the Volunteer movement, which started in 1860 and obtained the advocacy of many far-seeing medical men, and held the rank of honorary lieutenant-colonel. As a justice of the peace for Suffolk and as a worker on borough and county councils and on the Diocesan Committees he was highly esteemed amongst his neighbours of all ranks for the soundness and fairness of his judgment.

His funeral, which took place on April 10th, was attended by the mayor and corporation in state.

GEORGE ROWELL, F.R.C.S. ENG.,

SENIOR ANÆSTHETIST TO GUY'S HOSPITAL.

WE regret to announce the death of Mr. George Rowell, which took place at his residence, Cavendish-place, W., on April 18th, in his fifty-fifth year.

Rowell received his medical education at Guy's Hospital, and as a student was a prizeman who showed the promise which was in many ways justified in his later career. He qualified in 1886 with the M.R.C.S. Eng. and the L.R.C.P. Lond., proceeding to the F.R.C.S. three years later. After holding resident appointments at Guy's Hospital he became a surgeon in a Royal Mail steamship, and subsequently, in 1891, assistant anæsthetist at the Royal Dental Hospital, Leicester-square. His total connexion with the institution lasted 14 years, for he was appointed full anæsthetist in 1898 and resigned in 1905. In 1893 he became anæsthetist at Guy's Hospital and in 1896 demonstrator on anæsthesia, later being appointed lecturer in the medical school. He was also at one time anæsthetist to the West-End Hospital for Nervous Diseases and to the National Orthopædic Hospital. He was a prominent member of the British Medical Association, having been a member of the Council and honorary secretary of the Metropolitan Counties Branch, member of the Chloroform Commission, and assistant secretary of the Anæsthetic Commission. He was at the time of his death President of the Section of Anæsthetics of the Royal Society of Medicine.

Among his literary contributions to the subject in which he specialised were a chapter on the use of gas and air in "Underwood's Anæsthetics" and a paper read before the Harveian Society on the anæsthetisation of children, in which he advocated the method of beginning with the A.C.E. mixture, continuing with ether; this was published in THE LANCET, vol. i., 1897 (p. 1334). But Rowell was not a prolific writer or frequent speaker, and took no personal steps to show publicly the high qualities which his friends knew him to possess.

We are indebted to Sir W. Arbuthnot Lane for the following appreciation:—

George Rowell, who died last week at the age of 54, occupied for many years a very prominent and respected position in the anæsthetic world. He held many appointments, the chief being that of senior anæsthetist and lecturer on anæsthetics at Guy's Hospital. He was an excellent teacher, and was most popular with the students: the care and attention which he gave to their instruction have proved most useful to them in practice. As an anæsthetist he was perfect. He inspired his patient with absolute confidence, while the surgeon knew that he could rely implicitly on his skill and judgment, which, within the recollection of his friends, were never known to fail in a single instance. He was one of the first to recognise the value of open ether, which he advocated very strongly when he held the post of joint secretary to the British Medical Association's Commission on Chloroform Anæsthesia. Since the commencement of the war he has given his services freely to several voluntary hospitals, and it is largely due to the excessive strain which this additional work entailed that his vitality was so lowered as to render him unable to withstand the infection from which he died, and which he may well have acquired in the performance of his professional duties. He was one of the most warm-hearted, generous, and loyal men one could ever meet, and the name and recollection of George Rowell will always occupy a very warm and cherished spot in the hearts and memories of a much larger circle of friends than it is given to most men to enjoy. Their devotion to him was truly remarkable, and it will ever be a matter of regret to them that he did not better employ his exceptional abilities to his own personal advancement. He leaves behind a most loyal and devoted wife and son, to whom his loss is irreparable.

A personal friend writes as follows:—

George Rowell was one of the most popular men in the medical profession; probably few men had a larger circle of acquaintance, and certainly few a larger number of friends. Had he made greater efforts he would surely have acquired a name for himself in any branch of science that he chose to adopt. Without being exactly lazy, knowledge came so easily to him that he hardly appreciated at its true worth the value of personal exertion and effort in acquiring it and imparting it to others. Hence, although he had many of the essentials of a good teacher, he never made a great reputation for himself in this capacity. His reputation as one of the most careful and successful of anæsthetists in London was confined very largely to his own personal clientèle, and was not shared by nearly so large a number of the medical profession as it justly deserved to be. In spite of the fact that a very large proportion of difficult cases fell to his share, I suppose no anæsthetist in London had a record less marred by accidents. His sweet disposition, social qualities, and gregarious habits made him popular in any company and wherever he went. He was a man who enjoyed life and got much amusement and pleasure out of it; he was also a source of much pleasure to others. E. P.

IN an address recently delivered at the Conference of Chemists at Lahore Sir Thomas Holland put forward a plea for the organisation of chemical research in India with a view to the utilisation within the country of the raw materials which India so bountifully produces. To obtain the best results chemists should, he said, be formed into an organised corps instead of continuing to work in isolation.

QUEEN CHARLOTTE'S HOSPITAL, LONDON.—At the annual meeting, held on April 16th, Mr. F. W. Hunt, who presided, referred to the work done in caring for the wives of sailors and soldiers. Nearly 2000 patients had been admitted to the wards and over 1500 attended at home during the past year. The work of the ante-natal department had increased, the number of patients attending amounting to 3368. An infant consultation centre had also been opened, with an average attendance of 25 per session. Difficulties had been experienced in carrying on, high prices involving a considerable increase in expenditure and the shortage of nurses making it difficult to provide for the nursing. Reference was made to the loss sustained by the death of the treasurer, Mr. Alfred de Rothschild, who had held office for over 30 years. Captain Anthony de Rothschild had consented to take his place.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

The Military Service Act.

THE Military Service Act, which raises the military age to 50 in general, and to 55 in the case of medical practitioners, received the Royal Assent on Thursday, April 18th.

The Budget.

A number of increases of taxation are introduced in the Budget. The maximum rate of Income-tax is increased from 5*s.* to 6*s.*, with corresponding rises lower down the scale, but incomes below £500 are not to be affected. The spirit duty is to be increased to 30*s.* per gallon, but it has been announced that an abatement at least equal to the tax is to be allowed on spirit used in medical preparations.

HOUSE OF COMMONS.

WEDNESDAY, APRIL 17TH.

Medical Examination of Attested Men.

Mr. ROWLANDS asked the President of the Local Government Board whether, in view of the pledge that attested men should not be at a disadvantage with unattested men, he would amend Regulation 175 of the instructions to tribunals as to voluntary attested men, so that attested men might apply for exemption on the grounds of ill-health or infirmity equally with unattested men.—Mr. HAYES FISHER replied: Attested men alike with unattested men are examined as to their fitness for military service by National Service medical boards, and I would remind the honourable Member that attested men have the same rights as unattested men under the rules which have been issued by my Department of applying to the Appeal Tribunal for leave to be examined by the Medical Assessors if they are dissatisfied with their grading by the National Service medical board.

Mr. ROWLANDS: Am I to put that construction upon the Order issued in February last, which says that attested men cannot appeal on the ground of ill-health, and does that agree with the general Order under the Act of 1915 which was issued to the tribunals?—Mr. HAYES FISHER: Under the present practice everyone, whether attested or unattested, will be able to make an appeal to the medical board and can apply to the Appeal Tribunal to be examined by medical assessors. That affords to unattested men every protection they can desire to have on medical grounds.

Mr. PRINGLE: After the passing of the new Military Service Bill which left this House yesterday, is there to be any change in the regulations regarding medical examination and appeals on medical grounds to tribunals?—Mr. HAYES FISHER: No. So far as I am responsible for the issuing of Regulations, I do not contemplate taking away any of the rights as regards appeal on medical grounds which men have at present.

Mr. ROWLANDS: Will the right honourable gentleman modify the circular which says that attested men are not to apply on the ground of ill-health or infirmity?—Mr. HAYES FISHER: There is no need to modify it at all. They can now, and I hope they will always be able to, appeal on medical grounds to the Appeal Tribunal if they like for leave to be examined.

Mr. ROWLANDS: Why are these words in the circular?

Mr. PRINGLE: Is the right honourable gentleman aware that the Prime Minister in introducing the Military Service Bill announced that rights of appeal were to be limited, and can he give an undertaking that that intention has been departed from.—Mr. HAYES FISHER: I am not aware that my right honourable friend made any such statement. I have made my statement. So far as I am responsible I have no intention of taking away the rights which at present exist of appealing on medical grounds to the Appeal Tribunal.

Mr. ROWLANDS: May I take it that the tribunals, irrespective of this circular, will treat attested men on just the same lines as unattested men?—Mr. HAYES FISHER: The honourable Member must not put an interpretation on my words different from what I myself put. They have definite rights now of appealing to Appeal Tribunals on medical grounds, and they have no further rights. The tribunals must not take it that they have any further rights or that their position has been in any way altered.

Treatment of Discharged Soldiers in Ireland.

Mr. NUGENT asked the Pensions Minister whether a conference between representatives of the Pensions Ministry, the Irish Insurance Commission, the Local Government Board for Ireland, and the medical profession was recently held at Dublin, at which the doctors agreed to accept a remuneration on a capitation basis of 12*s.* 6*d.* in the urban districts and 15*s.* in the rural districts of Ireland on a panel system, provided they gave similar home treatment to discharged and disabled soldiers in Ireland as was now given under the National Health Insurance Act in Great Britain by the Insurance Commissioners; and, if so, would the similar department in Ireland administer the scheme as in the case of Great Britain—namely, the Irish Insurance Commission.—Mr. HODGE replied: The facts are accurately stated in the first part of the question. With regard to the latter part, I can only say that the report of the conference is now under consideration.

THURSDAY, APRIL 18TH.

Medical Standards of Military Fitness.

Mr. EDMUND HARVEY asked the Parliamentary Secretary to the Ministry of National Service whether the National Service Instruction No. 3, of 1917, regulating medical board examinations was still in force, or whether it had been modified or superseded by subsequent instructions reducing the minimum standards; and, if so, whether any such instructions would be published.—Mr. BECK answered: National Service Instruction No. 3, of 1917, was revised and republished as M.N.S.R. 24 on Feb. 28th, 1918, and can be obtained through His Majesty's Stationery Office by the public. The revised edition was undertaken with the object of making the instructions regarding medical arrangements and grading more comprehensive, and has in no way modified the general standards of fitness for military service. A National Service instruction dealing with the standards of vision was issued on April 6th. This instruction was drawn up after consultation by a committee of military and civil ophthalmic specialists. The standards decided upon are slightly lower than before.

Territorial and Reserve Medical Officers.

Sir JAMES BOYTON asked the Financial Secretary to the War Office whether the Army Council would award annually the gratuity due to Territorial and Reserve medical officers instead of at the end of the war, as in the case of temporary medical officers, so that the immediate financial position of these officers would be relieved and at no additional cost to the country.—Mr. FORSTER said in reply: I am afraid that I cannot adopt my honourable friend's suggestion.

Sanitary Services in Large Towns.

Sir WILLIAM COLLINS asked the President of the Local Government Board whether his attention had been called to the difficulties experienced by borough surveyors and sanitary departments in many large towns through the shortage in staff of those engaged in the removal of refuse and in performing other sanitary services by the withdrawal of soldier labour, which had for some time past been available to local authorities; and whether he would take whatever steps might be practicable to avoid the depletion of such services to an extent which might imperil the public health.—Mr. HAYES FISHER replied: My attention has been drawn to this matter. I am alive to the importance of not depleting unduly the sanitary staff of local authorities. I have suggested to some authorities the employment of uninterned enemy aliens. If the local military authorities are willing to make the services of soldiers available for this purpose their help, I have no doubt, would be of great value.

MONDAY, APRIL 22ND.

Medical Examinations under the Military Service Act.

Mr. GULLAND asked the Parliamentary Secretary to the Ministry of National Service whether, in view of the necessity of more careful inquiry as to the health of the elder men to be called up under the new Military Service Act, he would arrange that the opinion of the private medical attendants of called-up men should be taken more fully into consideration.—Mr. BECK replied: Under the instructions issued to Medical Boards, M.N.S.R. 24, which have already been published, the Boards are directed to give full consideration to medical certificates given by general practitioners or consultants, and I have every reason to believe that this instruction is being fully carried out. The instructions also provide that where necessary reference may be made to the man's usual medical attendant. It is intended to issue further special instructions dealing with the medical examination and grading of the older men.

Ozone Treatment of Cases of Gassing.

Sir GEORGE GREENWOOD asked the Under Secretary for War whether his attention had now been called to the treatment of cases of gassing by inhalations of ozone generated from atmospheric air as distinct from the treatment by the use of pure oxygen, and as employed by Major George Stoker, C.M.G., R.A.M.C., and described by him; whether he was aware that this treatment had produced excellent results; and whether he would take steps in order that it might be extensively used.—Mr. MACPHERSON replied: The method of treatment has been under trial for some time, but the results so far have not been such as to justify its general adoption. It is still under trial, and if the

results indicate the advisability of doing so its use will be adopted, but up to date its efficacy is not proved.

A Ministry of Health.

Mr. BOOTH asked the Minister of Reconstruction whether the Bill to set up a Ministry of Health was in print, and whether any Member of the House had been favoured with an advance copy.—Dr. ADDISON replied: Under the authority given me a draft of a proposed Bill was discussed with representatives of the different interests with whom I conducted negotiations. The Member for Derby acted as chairman of the representatives of Insurance Committees and Approved Societies, and was the only Member of Parliament who participated in the proceedings.

Mr. BOOTH asked whether the right honourable gentleman had considered the position of the medical profession in relation to the proposed Ministry of Health; what decision he had arrived at with regard to the suggestion of a State medical service; and whether it was proposed to decide these matters whilst so many doctors were away serving with the Forces.—Dr. ADDISON answered: The matter referred to in the second part of the question would not have been relevant to the conferences in regard to the establishment of a Ministry of Health which I have held amongst others with representatives of the medical profession.

Provision of Sanatoria.

Mr. NUGENT asked the Chief Secretary for Ireland whether he was aware that the Local Government Boards in Great Britain had urged on the Treasury the necessity of relaxing the regulation prohibiting expenditure of the unexpended balance of the capital grant under the National Health Insurance Act, 1911, so that certain local authorities should be provided with their share for erecting and equipping institutions for the treatment of tuberculosis; whether he was aware that as the result the money had been made available in Great Britain; that the Irish Local Government Board represented that there was no necessity for relaxing the regulation mentioned, and consequently Ireland was deprived of the unexpended balance of her share of the capital grant, amounting to £120,000; and, seeing that in Ireland the necessity for urgent accommodation was greater than in Great Britain, as evidenced by the fact that owing to the want of proper institutional accommodation for advanced cases such cases were admitted to sanatoria where early cases were under treatment, and owing to the increasing demand for accommodation for advanced cases in consequence of the war civilian cases in the early stages of tuberculosis could not secure beds in sanatoria, and were thereby a source of infection in their homes, and as evidenced by the returns of the death-rates from tuberculosis of the Registrar-Generals, would he say what action he proposed to take.—Mr. DUKE wrote in reply: A proposal for relaxing the regulation indicated, so far as may be necessary to provide accommodation in Great Britain for tuberculous men discharged from the Army and Navy, is under consideration. As regards the second and third parts of the question the honourable Member is misinformed. Any action to be taken in Ireland will be governed by the decision of His Majesty's Government on the general question.

TUESDAY, APRIL 23RD.

Medical Treatment o Soldiers' Wives.

Major D. DAVIES asked the Parliamentary Secretary to the Ministry of Pensions whether it was competent for the War Pensions Committees to make provision for medical advice and treatment of widows and children of soldiers, including the wives and children of soldiers who were now serving in the Army; and, if not, whether he would take steps to issue the necessary regulations to ensure this being done.—Sir A. GRIFFITH-BOSCAWEN answered: It is not within the competence of Local War Pensions Committees to make general provision for medical advice and treatment of the wives or widows and children of soldiers. Special cases in which there is pecuniary need can be met by grants under the recently extended Regulations of the Special Grants Committee.

Soldiers and Vaccination.

Answering Mr. CHANCELLOR, Mr. MACPHERSON (Under Secretary for War) said: Refusal by a soldier to be vaccinated is not an offence punishable under the Army Act. No officer is authorised to inflict punishment for such refusal. Soldiers voluntarily enlisted who at the time of their enlistment agreed in their attestation papers to be vaccinated cannot be punished under the Army Act for refusing to be vaccinated.

The Medical Service in France.

Major D. DAVIES asked the Under Secretary of State for War whether a decision had yet been arrived at regarding the Report of the Committee of Inquiry into the Medical Service in France; and whether he could now state if this report was to be presented to the House of Commons.—Mr. MACPHERSON replied: No decision has been arrived at and in the present circumstances consideration of the request has been suspended.

Medical News.

WE regret to announce the death of Dr. John Michell Clarke, physician to the Bristol General Hospital and professor of medicine in the University.

ROYAL MEDICAL BENEVOLENT FUND.—At the meeting of the committee held on April 9th 26 cases were considered and £278 voted to 23 of the applicants. The following is a summary of some of the cases relieved:—

Widow, aged 38, of M.B. Birmingham who practised at Chesterfield and died in January, 1917. Applicant was left with one daughter, aged 12, and practically no means. She is now acting as housekeeper, at a salary of £36 per annum. Desires help towards the education of her daughter. Voted £2 and referred to the Guild.—Daughter, aged 45, of M.R.C.S. Eng. who practised at Blackheath and died in 1880. Applicant is a trained nurse, and worked up to the end of April, 1917, when she developed tuberculosis, and is now going to a sanatorium. Only income interest on £200 War Loan. Requires help towards sanatorium expenses. Voted £10.—Widow, aged 68, of L.S.A. Lond. who practised at Feltwell and died in 1907. Present income from investments £22 4*s.* 11*d.*, which has greatly decreased to pre-war amount. Has tried to supplement this by taking in paying guests, but not successfully. Requires a little help towards expenses. Voted £12 in 12 instalments.—Widow, aged 40, of a surgeon in the Royal Navy, who died in 1906. Was left with three children, aged now 22, 16, 14. Income from pensions £98; investments £15; and receives £40 a year as matron of a boys' school. Desires help towards education of her son. Voted £5, and referred to the Guild.—Daughter, aged 77, of M.D. Glasg. who practised in London and Glasgow and died in 1845. Applicant's income from dividends £44, and has one boarder at 17*s.* a week. Her main income is derived from letting her cottage furnished during the summer, but since the war has not been successful. Rent and rates £37. Voted £15 in 12 instalments.—Daughter, aged 49, of M.D. Glasg. who practised at Bawtry and died in 1872. Prior to the war was able to make a living by taking in paying guests, and as her house is on the East Coast she has had none since September, 1915. Lives in own house, and pays £8 for rates. Is now doing a little clerical work, but this is not sufficient to keep her. Relieved three times, £30. Voted £10 in two instalments.—Daughter, aged 51, of M.D. Dub. who practised at Cambridge and died in 1904. Applicant had a school for some years but is now completely blind in one eye and has almost lost the sight of the other, so had to give it up. Has a small pension from a blind society and help from the Guild. Relieved twice, £25. Voted £18 in 12 instalments.—Daughter, aged 69, of M.D. Edin. who practised in Lincolnshire and died in 1888. Applicant acts as matron at an orphanage, without salary, and only receives board and lodging. Desires a little help for clothes and pocket money. Relieved three times, £29. Voted £12 in 12 instalments.—Widow, aged 63, of M.B. Glasg. who practised at Birkenhead and died in 1885. Was left entirely without means, with three daughters now aged 36, 35, 34. Two are working and contribute £1 18*s.* per week. The other daughter suffers from ill-health. Applicant suffers from neuritis and debility. Relieved eight times, £108. Voted £6 in 12 instalments.—Daughter, aged 60, of M.R.C.S. Eng. who practised at Battle and died in 1873. Applicant has no means, and suffers from acute rheumatism. Entirely dependent on sister, who cannot afford to keep her. Relieved 34 times, £278. Voted £12 in 12 instalments.

Subscriptions may be sent to the acting honorary treasurer, Dr. Samuel West, at 11, Chandos-street, Cavendish-square, London, W.1.

AT the quarterly meeting of the directors of the Naval Medical Compassionate Fund, held on April 16th, Sir W. H. Norman, K.C.B., in the chair, the sum of £55 was distributed among the several applicants.

Dr. J. M. H. Macleod will give a course of demonstrations on skin diseases, especially those met with in military wards, on Tuesdays at 3 o'clock in the Lecture Theatre at Charing Cross Hospital, commencing on Tuesday, May 7th. These demonstrations are open to all medical practitioners and medical students on production of card.

DONATIONS AND BEQUESTS.—The Royal Dental Hospital, Leicester-square, London, has received a special donation of £250 from the Worshipful Company of Goldsmiths, a donation of £50 from the Worshipful Company of Clothworkers, and a donation of 5 guineas from the Trustees of Berman's Charity.

ST. THOMAS'S HOSPITAL MEDICAL SCHOOL (UNIVERSITY OF LONDON).—A series of lectures and demonstrations on the Feeding and Care of Infants will be given by Dr. F. Truby King on Tuesdays and Fridays from 5.30 to 6.30 P.M., beginning May 3rd, in the Governors' Hall. The lectures are open to members of the medical profession, students, nurses, and infant welfare workers. Cards of admission on application to Mr. G. Q. Roberts, the secretary.

PUERPERAL FEVER IN TASMANIA.—According to the annual report for 1916–17 of the Tasmanian Department of Public Health, issued by Dr. C. L. Park, cases of puerperal fever were only reported from nine municipal districts during the year. Eighteen notifications were received altogether, including six from the district of Hobart. In continuation of the policy adopted in the past, the midwives attending these cases were suspended from practice for a period of 21 days.

Medical Diary for the ensuing Week.

SOCIETIES.

ROYAL SOCIETY, Burlington House, London, W.
THURSDAY, May 2nd.—Papers:—Dr. J. H. Mummery: On Nerve End Cells in the Dental Pulp (communicated by Sir Ernest Schäfer).—Mr. H. Onslow: The Nature of Growths in Colloidal Silica Solutions (communicated by Dr. F. G. Hopkins).

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.
MEETINGS OF SECTIONS.

Wednesday, May 1st.

SURGERY (Hon. Secretaries—Raymond Johnson, V. Warren Low): at 5.30 P.M.
Annual General Meeting.

Thursday, May 2nd.

OBSTETRICS AND GYNÆCOLOGY (Hon. Secretaries—T. G. Stevens, Comyns Berkeley): at 5.30 P.M.
Annual General Meeting.—Election of Officers and Council for 1918-1919.
Dr. Oswald Dinnick: An Unusual Case of Acute Uterine Inversion.
Dr. Herbert Spencer: Undiagnosed Cancer of the Body of the Uterus complicating Myoma, treated by Total Abdominal Hysterectomy.

Friday, May 3rd.

LARYNGOLOGY (Hon. Secretaries—W. D. Harmer, Frank A. Rose): at 4 P.M.
Annual General Meeting.—Election of Officers and Council for 1918-1919.
Cases and Specimens:
Will be shown by Dr. Brown Kelly, Dr. Andrew Wylie, Dr. Dan McKenzie, and Mr. Harmer.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.
MONDAY, April 29th.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. D. Armour: Operations. Mr. B. Harman: Diseases of the Eye. Dr. Simson: Diseases of Women.
TUESDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.
WEDNESDAY.—10 A.M., Dr. Arthur Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.
THURSDAY.—2 P.M., Medical and Surgical Clinics. Mr. D. Armour: Operations. Mr. B. Harman: Diseases of the Eye.
FRIDAY.—10 A.M., Dr. Simson: Gynæcological Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.
SATURDAY.—10 A.M., Dr. Arthur Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. Mr. B. Harman: Eye Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.
Out-patients each day at 2.30 P.M.
(Details of the Post Graduate Course were given in the issue of April 6th.)

ST. THOMAS'S HOSPITAL MEDICAL SCHOOL (UNIVERSITY OF LONDON), Governors' Hall, St. Thomas's Hospital, S.E.
FRIDAY, May 3rd.—5.30 P.M., Dr. F. Truby King: The Feeding and Care of Infants. (Lecture I.)

THE THROAT HOSPITAL, Golden-square, W.
MONDAY, April 29th.—5.15 P.M., Special Demonstration of Selected Cases.
THURSDAY.—5.15 P.M., Clinical Lecture.

ROYAL INSTITUTION OF GREAT BRITAIN, Albemarle-street, Piccadilly, W.1.
THURSDAY, May 2nd.—3 P.M., Lecture:—Sir Isambard Owen: Rheims Cathedral. (Lecture II.)

Appointment.

DICK, A., M.B., Ch.B. Glasg., has been appointed Certifying Surgeon under the Factory and Workshop Acts for the Birstal District of the County of York.

Vacancies.

For further information refer to the advertisement columns.

Bradford, Odsal Sanatorium.—Temp. M.O. £350.
Bridgwater Hospital.—H.S. £140.
Brighton Hospital for Women.—H.S. £100.
Bristol Royal Infirmary.—H.P. and H.S. £120.
Caterham Asylum, Caterham.—Temp. Asst. M.O. £7 7s. per week.
Central London Throat and Ear Hospital, Gray's Inn-road, W.C.1.—Res. H.S.
Cripplegate Schools Foundation.—Med. Adviser to Lady Holles' Girls' School, Hackney. £1 1s. per hour.
Dudley, Guest Hospital.—Sen. Res. M.O. £150. Also Asst. H.S. £120.
Evelina Hospital for Children, Southwark, S.E.—H.P. £160.
Grimsby and District Hospital.—Temp. H.S. £5 5s. per week.
Hospital for Epilepsy and Paralysis, Maida Vale.—Hon. Oph. S.
Huddersfield Royal Infirmary.—Res. H.S. £250.
Ilford Isolation Hospital and Sanatorium.—Temp. M.O.H., Temp. Sch. M.O., and Temp. Med. Superintendent. £550.
London County Mental Hospital, Epsom.—Temp. Asst. M.O. 7 gs. p.w.
Manchester City.—Female M.O. £400.
Newark Hospital.—Female H.S.
Nottingham General Hospital.—Female Casualty H.S. £250.
Plaistow Fever Hospital, E.—Female M.O. £300.
Queen Mary's Hospital for the East End.—H.S.
Recuperative Hostels for Sailors and Soldiers Invalided with Nerve Strain, W.—Res. M.O. £400.
Rotherham Hospital.—Junior H.S. £150.
Sheffield City Tuberculosis Dispensary.—Female Assist. M.O. £400.
Sheffield Royal Infirmary.—H.S. £120.
Sheffield Union Hospital, Firvale.—Asst. M.O. £300.
Warrington County Borough.—Temp. Asst. M.O.H. £400.
West Ham County Borough.—Temp. Tuberculosis Officer. £500.
West Riding of Yorkshire.—Maternity and Child Welfare.—Female Medical Practitioner. £400.
Wolverhampton and Staffordshire General Hospital.—H.S. £200.

THE Chief Inspector of Factories, Home Office, S.W., gives notice of vacancies for Certifying Surgeons under the Factory and Workshop Acts at Motherwell, Lanarkshire; and at Newton Abbot, Devonshire.

Births, Marriages, and Deaths.

BIRTHS.

HAIG.—On April 13th, at Doubleton's, Penshurst, the wife of Captain Kenneth G. Haig, R.A.M.C., of a daughter.
SOAMES.—On April 21st, the wife of Captain R. M. Soames, R.A.M.C., of Ridgeway, Reigate Hill, Reigate, of a son.

MARRIAGES.

BOWER—MCCAUL.—On April 17th, at St. Columba's Church, Pont-street, London, Captain Harold James Bower, R.A.M.C., to Mary Esther, elder daughter of Dr. Geo. B. McCaul and the late Mrs. McCaul, of Londonderry, Ireland.
HARRISON—FLOWER.—On April 15th, at Tring, Captain W. Ll. A. Harrison, M.C., R.A.M.C., to Rosalie Sibyl, daughter of Captain S. S. Flower, R. of O., late 5th Fusiliers, and Mrs. Flower.
JERVIS—ANDREW.—At 10, Bank-ave., Downfield, Dundee, on April 17th, by the Rev. Alexander Anderson, B.D., Mains and Strathmartine Parish Church, John Johnstone Jervis, M.D., D.P.H., Acting Medical Officer of Health, Leeds, to Agnes Wright Andrew, M.A., M.B., Ch.B., only daughter of Mr. and Mrs. James M. Andrew.

DEATHS.

BROADBENT.—On April 16th, at Den Haag, South Side, Clapham Common, Francis Wesley Broadbent, M.B., F.R.C.S., aged 50.
BULKELEY.—Killed in action, on April 10th, Captain Llewelyn Alfred Henry, R.A.M.C., aged 37.
MARSHALL.—On April 20th, at St. John's Hospital, Twickenham, Francis Edward Marshall, M.R.C.S., L.R.C.P., in his 54th year.
MARTIN.—On April 14th, at The Croft, Treharris, Glam., Edward Graeme Martin, B.A. Cantab., M.R.C.S., L.R.C.P., aged 33 years.
MICHELL CLARKE.—On April 21st, at Headland House Hotel, Looe, Cornwall, John Michell Clarke, M.A., M.D., F.R.C.P., aged 58.
SMITH.—On April 16th, at Fieldgate, Kenilworth, Warwickshire, Frank Smith, M.R.C.S., L.R.C.P.

N.B.—A fee of 5s. is charged for the insertion of Notices of Births, Marriages, and Deaths.

METEOROLOGICAL READINGS.

(Taken daily at 8.30 a.m. by Steward's Instruments.)
THE LANCET Office, April 24th, 1918.

Date.	Rain-fall.	Solar Radio in Vacuo.	Maxi-mum Temp. Shade.	Min. Temp.	Wet Bulb.	Dry Bulb.	Remarks.
April 18	...	74	45	39	42	43	Overcast
,, 19	...	81	44	33	35	38	Cloudy
,, 20	0·11	75	42	34	37	37	Cloudy
,, 21	0·23	63	44	35	36	36	Snowing
,, 22	0·57	92	55	36	42	44	Cloudy
,, 23	0·02	70	54	41	42	41	Raining
,, 24	0·04	67	55	39	46	50	Cloudy

Other information which we have been accustomed to give in these "Readings" is withheld for the period of the war.

BOOKS, ETC., RECEIVED.

BALE, JOHN, SONS, AND DANIELSSON, London.
The Panel Doctor: His Duties and Perplexities. By T. M. Tibbetts, M.D. 2s. 6d.

BUTTERWORTH AND CO., Calcutta and London.
Painless Childbirth in Twilight Sleep in the East. By C. Webb-Johnson, Captain, R.A.M.C. (T.F.). Foreword by Captain V. B. Green-Armytage, I.M.S. Rs. 4.

CHURCHILL, J. AND A., London.
Foods and their Adulteration. By H. W. Wiley, M.D. 3rd ed. 24s.

DUCKWORTH AND CO., London.
Medical Contributions to the Study of Evolution. By J. G. Adami, M.D., F.R.S. 18s.

OXFORD PRESS WAREHOUSE, London.
Applied Bacteriology. Edited by C. H. Browning, M.D. 7s. 6d.

EDITORIAL NOTICES.

In consequence of the pressure on our space and the shortage of paper, the Editor may be compelled to abbreviate communications, as an alternative to their rejection, when time does not allow them to be reconsidered by their authors.

It is especially requested that early intelligence of local events having a medical interest, or which it is desirable to bring under the notice of the profession, may be sent direct to this office.

Letters, whether intended for insertion or for private information, must be authenticated by the names and addresses of their writers—not necessarily for publication.

We cannot undertake to return MSS. not used.

Offices: 423, STRAND, LONDON, W.C. 2.

Communications, Letters, &c., to the Editor have been received from—

A.—Messrs. Claudius Ash, Sons, and Co., Lond.; Sir William M. A. Anderson, M.V.O., Lond.; Admiralty, Medical Department, Lond.

B.—Messrs. Burroughs Wellcome and Co., Lond.; Board of Education, Lond.; Dr. R. K. Brown, Lond.; Board of Trade (Marine Department) Lond., Asst. Sec. of; Major F. W. Broderick, R.A.M.C.; Messrs. D. W. Bell and Co., Lond.; Board of Agriculture and Fisheries, Lond.; Dr. T. A. Broker, Ahmedabad; Messrs. Butterworth and Co. (India), Ltd., Calcutta; Baby-Saving League of British Guiana, Georgetown.

C.—Dr. H. P. Cholmeley, Forest Row; Major C. F. Coombs, R.A.M.C.(T.); Major F. Coleman, R.A.M.C.; Dr. J. T. Clarke, Ipoh, Perak; Mr. B. H. Cunnington; Mr. J. F. Colyer, Lond.; Charity Organization Society, Worcester, Hon. Sec. of.

D.—Dr. K. K. Dadachanji, Bombay; Dr. L. Dobson, Lond.; Dr. V. Dickinson, Lond.

E.—Mr. G. Erskine, Lond.; Dr. F. W. Edridge-Green, Lond.

F.—Dr. R. Fothergill, Hove.

G.—Capt. F. B. Gurd, R.A.M.C.

H.—Capt. L. F. Hirst, R.A.M.C.; Major F. Hobday, A.V.C.; Lieut. J. B. H. Holroyd, R.A.M.C.; H. B. T.; Mr. C. J. Heath, Lond.

I.—Illuminating Engineering Society, Lond.

K.—Mr. W. H. Kesteven, Kingston-on-Thames; Mrs. A. Kellgren-Cyriax, Lond.

L.—Mr. N. C. Lake, Lond.; Dr. T. D. Lister, Lond.; Dr. R. B. Low, Lond.

M.—Dr. R. Morton, Lond.; Dr. J. B. Mennell, Lond.; Lieut.-Col. C. S. Myers, R.A.M.C.; Mr. G. K. Menzies, Lond.; Lieut.-Col. J. L. A. Mackay; Mr. R. W. May, Lond.; Mr. J. MacMunn, Lond.; Sir John Moore, Dublin; Surg.-Gen. Sir G. H. Makins, G.C.M.G., C.B.; Major C. A. Morton, R.A.M.C.(T.); Mr. J. C. McLeod, Lond.; Ministry of Food, Lond.

N.—National Baby Week Council, Lond., Sec. of; Major C. Noon, R.A.M.C.

O.—Mr. J. Offord, Lond.; Capt. S. A. Owen, R.A.M.C.

P.—Dr. A. Pettit, Paris; Dr. H. W. Pooler, Stonebroom; Dr. E. Pritchard, Lond.; Dr. E. P. Poulton, Woldingham; Mr. E. Pink, Lond.; Miss M. Philp, Oxford; Dr. O. Paget, Fremantle.

Q.—Queen Charlotte's Lying-in Hospital, Lond., Sec. of.

R.—Sir Leonard Rogers, C.I.E.; Royal Dental Hospital of London, Sec. of; Dr. A. E. Russell, Lond.; Royal Institution of Great Britain, Lond.

S.—Dr. G. F. Still, Lond.; Prof. J. W. W. Stephens, Liverpool; Mr. R. M. Stewart, R.A.M.C.; Capt. A. G. Shera, R.A.M.C.; Mrs. G. Sandwith, Lond.; Major T. D. M. Stout, D.S.O.; Dr. H. Sharman, Lond.; Major S. A. Smith, D.S.O., R.A.M.C.; Dr. R. W. Starkie, Lond.; Dr. Agnes Savill, Lond.; Dr. E. I. Spriggs, Banff; Dr. G. F. Stebbing, Lond.

T.—Mrs. L. Taylor, Bromley; Mr. L. L. Thain, Gloucester; Dr. C. H. Treadgold, Lond.; Dr. A. H. Thompson, Lond.

W.—Lieut. R. Wade, R.A.M.C.; Capt. C. Worster-Drought, R.A.M.C.; Mr. W. Woodbridge, Norwich; Prof. A. D. Waller, Lond.; Capt. H. Whitehead, R.A.M.C.

MANAGER'S NOTICES.

TO SUBSCRIBERS.

Subscribers, by sending their subscriptions direct to THE LANCET Offices, will ensure regularity in the despatch of their Journals and an earlier delivery than the majority of Agents are able to effect.

SUBSCRIPTION RATES.

INLAND.

One Year	£1 10 0
Six Months	0 16 0
Three Months	0 8 0

COLONIES and ABROAD.

One Year	£1 12 6
Six Months	0 17 6
Three Months	0 8 9

Subscriptions (which may commence at any time) are payable in advance. Cheques and Post Office Orders (crossed "London County and Westminster Bank, Covent Garden Branch") should be made payable to the Manager, Mr. CHARLES GOOD, THE LANCET Offices, 423, Strand, London, W.C. 2.

ADVERTISEMENT RATES.

Books and Publications ... ...
Official and General Announcements
Trade and Miscellaneous Advertisements ... ... } Four lines and under ... ... 4*s.* 0*d.*

Every additional line, 9*d.*
Quarter Page, £2. Half a Page, £4.
Entire Page, £8.
Special terms for Position Pages.

Notes, Short Comments, and Answers to Correspondents.

THE MEDICINE OF THE STAGE.

To the Editor of THE LANCET.

SIR,—May I, as a member of the medical world, lodge a word of protest in your columns concerning a play entitled *The Knife* at the Comedy Theatre? I was present there the other evening upon the advice of friends who had seen it. To my surprise I discovered than the main theme employed was the advocacy of vivisecting human beings (by way of achieving revenge) by a "New York Doctor" on social outcasts posing as fortune tellers, who had been responsible for the violation of his fiancée.

That such a play, harrowing and morbid in its theme, and opposed to all laws of humanity, should be permitted to see the light of day passes my humble comprehension, and my object in writing this is in the hope that we of the medical profession duly record our protest.

I am, Sir, yours faithfully,
R. W. STARKIE, M.R.C.S., L.R.C.P., L.M.

Oakley-square, N.W., April 19th, 1918.

IN THE FOOTSTEPS OF HOOKER.

Lieutenant-Colonel W. J. Buchanan, I.M.S., has reprinted in pamphlet form his article in a recent number of "Bengal Past and Present" containing an appreciation of the travels in Sikkim and Nepal of Sir Joseph Dalton Hooker, the veteran botanist and traveller, whose centenary was celebrated last year. The second son of Sir W. J. Hooker, Director of the Royal Gardens at Kew, Joseph Dalton Hooker graduated M.D. Glasg. in 1839, when he was commissioned as assistant surgeon and naturalist to the *Erebus* and *Terror*, the vessels of the Antarctic expedition under the command of Captain (afterwards Sir) James Ross. In 1846 he was appointed botanist to the Geological Survey of Great Britain, and in the following year he visited India, where for over four years he explored the Himalayas. Colonel Buchanan writes:—

> "In the course of many wanderings through Sikkim, I have found Hooker's book 'Himalayan Journal" such a source of pleasure and so generally accurate as a guide-book that it has been my custom for some years past to make notes of places passed, seen, or described by Hooker, and have thus noted in many parts of his book changes of name, changes in spelling, and alteration in routes, paths, and roads, that it recently seemed to be worth while to attempt to follow Hooker in his great tours in Sikkim and to indicate where necessary the few mistakes which he made, as discovered by other and later travellers or by my personal observation."

Only a passing reference is made to Hooker's six weeks' imprisonment by the Rajah of Sikkim which led to the annexation of Sikkim Terai. The value of the article is increased by a series of excellent reproductions of Himalayan photographs, as well as a map, and brief notes of tours made by other travellers. Everyone interested in this great Victorian botanist should read Mr. Leonard Huxley's "Life and Letters of Sir Joseph Dalton Hooker," just published in two volumes by Mr. John Murray.

PROFESSIONAL DISEASES: THE NEWEST PATHOLOGY.

To the Editor of THE LANCET.

SIR,—There are many theories of the cause and origin of disease. Hardly a week passes but a new theory is added to existing theories. Hitherto very little attention has been directed to the "professional theory." This has recently been propounded by a one-time inmate of Colney Hatch; he is, at the time of writing, inside again. This gentleman's theory—the details of which are being jealously guarded lest Hun agents should "borrow" them—is simplicity itself and promises to be an (in)valuable contribution to the medical science of our day. In brief, it ascribes every form of mental obliquity to the influence of the profession, trade, or occupation which the patient pursues. It renders diagnosis simple, and will, for this reason if for no other, be popular among the over-worked members of the medical profession. Given the patient's occupation, one can—within limits—give the disease. As thus:—

1. *The Legal Profession.*—If the patient be a young barrister you will be safe to treat him for swelled head. Make strict inquiries as to how many briefs he has. If he has none the swelling is not likely to give serious trouble and will probably subside in a year or two. But should he be what is popularly known as a "rising" barrister the trouble may prove deep-seated. As the head swells a lightness will set in which will facilitate his rise. Should the very serious complications of "smartness" and "repartee" ensue there will be small chance of his recovery and the disease will run its course until the patient dies or is made a judge. In the latter case the malady is likely to assume a modified form. At this stage the patient's features assume a set and owl-like appearance; he mumbles and perpetrates feeble jokes at which he laughs immoderately. Treat him for softening of the brain and try to persuade him to decide such cases as come before him by a throw of the dice.

2. *The Clergy.*—When called in by the clergy pay special attention to the voice and manner of the patient. There is only one serious ailment likely to be contracted in clerical circles—i.e., Pulpititis. This malady takes many forms. The commonest is for the poor fellow thus afflicted to talk as though he were standing above you in the pulpit, and, once started, it is very difficult to prevail on him to stop. The best way to break the flow of this rush of words to the head will be to watch your opportunity until he lets fall the magic phrase, "And now." If you then start to your feet and utter a deep and fervent "Amen:" he will become confused, lose the thread of his discourse, and stop. Should this method fail recourse must be had to a bucket of cold water. During recovery give the patient funny stories to read, commencing with such mild witticisms as appear in the religious weeklies and working up to *The Pink 'Un* and *The Joy Rag.*

3. *Artists.*—The disease known as "Capillus longus," though not now met with so frequently as in former days, is still occasionally encountered in Chelsea and other Art centres. The best results are gained by introducing the parasites popularly referred to as "Things" into the patient's hair. These little creatures will, according to their nature, set up an irritation or tickling which will materially assist him in making up his mind to wear his hair short. In cases of "Futurism" little can be done beyond introducing the sufferer to a "Pastist" of the opposite sex. Should they marry, there is some satisfaction to be derived from the reflection that any children resulting from the union will almost certainly be "Presentists."

4. *Doctors.*—Members of the medical profession are very seldom ill. But when they are the difficulties of treatment are seriously increased by their frequent and obstinate refusal to take medicine. The pathological condition known as medicophobia erects a barrier which it is highly difficult to overcome. It is not, of course, that doctors have any doubts as to the efficacy of the drugs they dispense. Their attitude is purely altruistic. The more drugs they drink the less there will be for their patients. One of the after-effects of medicophobia is that doctors who have contracted the disease live to an extreme old age. Dr. Parr (who refused to take his own pills) lived to 150 years (or was it 200?). Such longevity is not in the best interests of the profession, since the younger men have to wait so long for a practice. Medicine in these cases should be forcibly administered. Veronal gives good results.

5. *Grocers.*—A curious disease is abroad amongst grocers at the present time. Its distinguishing feature is a complete inability to part with their goods. The sight of a pound of margarine or a side of bacon induces a species of palsy most distressing to behold. Butter, which in pre-war days would not melt in their mouths, now dissolves easily—and even margarine. Surliness and a species of rabies supervene when a customer enters the shop. Brace the system and encourage the patient to tell you what he would do with the Kaiser.

6. *Bishops.*—The prevailing episcopal disease is heresy followed by sharp spasms of schism. It affects different bishops in different ways. What in one bishop is a serious heresy, in another is scarcely even a schism. In old days these attacks were followed by burning fevers. But to-day the distemper is comparatively mild and no burning results. The malady is thought to be induced by a too full habit of mind, and good results are obtained by forbidding the sufferer to think. In troublesome cases it may even be necessary to remove the brains (if any).

7. *Politicians.*—The most serious disease likely to afflict politicians is horror honoris or dread of honour. This manifests itself in a consuming terror lest a title should be thrust upon the patient for services rendered his country. It is useless to argue and seek to persuade him that he has done nothing to merit popular recognition. The dread of a baronetcy haunts him by day and by night. There is no cure for this disease, and when the patient dies "full of years and honours" there is nothing more for the medical man to do except to attend the funeral in a silk hat and black kid gloves.

I am, Sir, yours faithfully,

April 20th, 1918. R. B. I.

A NEW MEDICINE POCKET-CASE.

Messrs. Burroughs, Wellcome, and Co. have issued a new medicine pocket-case (No. 128) intended for hard wear. The actual case is of metal overlaid with black morocco leather; every available space is utilised to the best possible advantage; and the contents are 23 tubes of "tabloid" and "soloid" products, including preparations for hypodermic and ophthalmic medication, an all-glass aseptic hypodermic syringe, needles and brass wires in removable tray, and a vulcanite rod for application of ophthalmic products. The measurements of the case are $6 \times 3\frac{1}{2} \times 1$ inches.

THE LINK BETWEEN SCHOOL INSPECTION AND INDUSTRIAL HYGIENE.

In a recent number (No. 62) of the reprint series from the Department of Health of the City of New York Dr. Louis I. Harris, who is chief of the division of industrial hygiene, describes industrial hygiene as one phase of the new public health viewpoint, which seeks to continue supervision over adults in much the same fashion as public health bodies exercise guardianship over the health of children until they are of working age. There seems, he trenchantly remarks, to be no logical explanation for the abrupt discontinuance of medical supervision at the close of school life. He goes on:—

> Health departments may eliminate a large part of the expense of maintaining tuberculosis sanatoria and other institutions for the care of the sick by following children of working age into the factories which they enter, maintaining healthful conditions in all manufacturing establishments, especially those giving employment to a large number of minors. The physically handicapped child, entering industry, should be the special object of solicitude. This means a radical revision of child labour laws and their enforcement.

Dr. Harris's suggestion is in the same direction as the action recently taken through the London Central Advisory Committee for Juvenile Employment (THE LANCET, April 13th, p. 555).

LECTURES FOR INTENDING BABY WEEK SPEAKERS.

THE National Baby Week Council is desirous of enlisting in its campaign the help of medical men and women, nurses, midwives, health visitors, and other groups of child welfare workers. A course of lectures for the guidance of prospective speakers has been arranged as follows on Mondays, at 5.30 P.M., at Dr. Williams' Library, 14, Gordon-square, London, W.C.:—

May 6th: "Mothercraft in the Rearing of an Imperial Race," Dr. F. Truby King.
„ 13th: "Baby Week, its Object and its Future," Miss Alice Elliott.
„ 20th: "Civic Responsibility with Regard to Child Welfare," Dr. Harold Scurfield.
„ 27th: "Provision for Maternity," Dr. J. S. Fairbairn.
June 3rd: "Factors of Infant Mortality," Dr. C. W. Saleeby.
„ 10th: "The Working-class Mother's Point of View," Mrs. H. B. Irving.

Cards of admission may be obtained free on application to the secretary, National Baby Week Council, 27A, Cavendish-square, London, W. 1, a stamped addressed envelope and visiting card being enclosed with the application.

"THE FUTURE OF DRIED MILK."

WITH reference to an annotation under the above heading in THE LANCET of April 6th, Messrs. Glaxo, of 155, Great Portland-street, point out that dried milk prepared by the Hatmaker process is produced directly from the natural raw milk itself without the previous condensation adopted in the case of milk dried by the spray process. There seems to be a legitimate difference of opinion as to whether a part of the proteins is rendered insoluble by hot drying processes. It is stated in the Local Government Board report, referred to in the annotation, that there is coagulation of albumin and globulin, but that caseinogen is not coagulated, while there seems to be a general agreement that the latter, which is the chief protein of milk, is more readily digestible after heating owing possibly to some alteration in the constitution of the protein molecule.

A PLEA FOR POLYPHARMACY.

IN the course of an article entitled "General Law and Individualism," by Mr. Edwin Wooton, in the April number of the *Dublin Journal of Medical Science* the author sets out to explain the therapeutic success of quack remedies. "Let us be honest as to this. Some patent medicines on the market do cure," he says, "even when skilled specialists have failed," and he submits that the main causal difference is this:—

> The medical man has a choice of, say, six drugs. He selects one, and gets a poor result. He prescribes another, which has an equally poor effect. He uses a third and a fourth in combination, and this proves more successful. And then the patient dismisses him, or, continuing with the combined remedies, makes the poorest of poor recoveries. Now, the quack—avoiding, of course, the crass blunder of using chemical incompatibles—throws all the six things "good for the disorder" into one bottle or pill. .....
>
> A patient may be insusceptible, comparatively, to three of the six drugs; be a little more affected by two others; and be very readily affected by the sixth. Well, the doctor omits to give this, but the quack ensures that if a "cure" be obtainable by using any one of the six, the man who buys his pill or potion shall have the wonder worker. This is the mitrailleuse; and, without doubt, when chemically practicable, and not one of the ingredients is potentially injurious, it is a surer way of getting to one's objective than by trusting one's judgment to hit the target at the first shot.
>
> This principle of the mitrailleuse applies to formulæ for germicides in dealing with human tissues in the living subject. A compound of compatible drugs, each having a germicidal action, acts more effectively than any one ingredient—even when the total of the compound used is exactly equal to the quantity of the strongest ingredient—when the latter is used by itself. ..... It is impracticable to use the most powerful germicides quite freely for fear of toxic consequences. Six, eight, or ten compatibles in non-toxic doses will have an effect approximating to the one that we should look for from the use of the strongest constituent were we at liberty to employ it.

The logical result of Mr. Wooton's reasoning would be to use the sweepings of the apothecary's shop after a bomb explosion as a universal remedy, but we think he has not arrived at a complete explanation of the quack's success, the frequency of which is so magnified. There are psychic factors.

A LETTER to the *Yorkshire Herald*, signed by Dr. Edmund M. Smith, M.O.H. for the city of York, states that the managers of picture palaces in the city have acceded to his request to exclude all young children from attendance during the next few weeks in order to prevent the spread of measles. The letter goes on to impress upon parents their responsibility in preventing young children of infected households from attending schools or places of amusement. Dr. Smith is obtaining by diplomacy a measure of civic hygiene which cannot be legally enforced.

The following journals, magazines, &c., have been received:—Journal of Physiology, Archives of Radiology and Electrotherapy, British Journal of Children's Diseases, Pharmaceutical Journal, Archives de Médecine et Pharmacie Navales, Journal of Anatomy, Archives de l'Institut Pasteur de Tuni, Arkiv för Kirurgi, Stockholm,